World Petroleum

JUNE
1953

"Shore purty...but how does she shoot?"

No matter how pretty the package, everything in the end rests on the question — how well does it *work!* The guns used in Lane-Wells Gun Perforating aren't particularly beautiful, but 190,000 perforating jobs in all the oil fields of this country prove that they do the job they were built for — and do it *right,* the first time! Because, operators' records show an efficiency of 97% — a perforating record that has no equal. Ask your Lane-Wells man.

Tomorrow's Tools Today!

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LANE WELLS FOR BETTER PERFORATING

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Unique

"Newallastic" bolts and studs have qualities which are absolutely unique. They have been tested by every known device, and have been proved to be stronger and more resistant to fatigue than bolts or studs made by the usual method.

C. P. Newall & Co., Ltd.

POSSILPARK GLASGOW · N

What's NEW

In Perforating, Logging, and Fishing Tool Services

McCULLOUGH®
NEW SERVICES • NEW TOOLS
NEW WAYS OF DOING THINGS

Latest News About New Tools, Techniques and Services

Do You Have Any of These

Production Problems?

Read how new and improved McCullough M-3 Burrless Bullet and Glass Jet Perforators solve the tough ones

—JOBS SELECTED FROM RECENT McCULLOUGH FIELD REPORTS—

PROBLEM	SOLUTION	RESULT
1. Producing well loses all production. No production even after perforating by other make of jet perforator.	Improved McCullough 2¼" Sectional Burrless Bullet Perforator. Twenty holes shot through the 4½" cemented upset tubing at about 6800 feet. Time one hour and 45 minutes.	**0 B/D to 70 B/D**
2. New Well. Very hard chalk formation. Always had to be acidized to make production. Two strings cemented casing—5½" and 7".	Improved McCullough Super Formation Glass Jet Perforator and Steel Strip Carrier. Twenty-five holes shot at about 2100 feet. Time—one hour.	**0 B/D to 50 B/D** More production than usual from this formation and without acidizing.
3. Had been perforated with other make perforator, swabbed dry without recovering any oil.	Improved McCullough Standard Glass Jet Perforator and Steel Strip Carrier. Thirty holes shot through 5½", 15½# cemented casing at about 5700 feet. Time —one hour and thirty minutes.	**0 B/D to 360 B/D** Best well in field.
4. Well had been shot by other make jet perforator without results.	Improved McCullough 3½" M-3 Burrless Bullet Perforator shot 260 ½" holes at about 10,000 feet. Time—seven hours.	Well surfaced and started flowing in five hours. Production not given.
5. Company engineer wanted well perforated fastest way.	New McCullough Super Casing Glass Jet Perforator with a 50 foot Steel Strip Carrier.	Two hundred holes shot simultaneously in one hour and five minutes—a savings of four hours rig time.
6. New Well. Operator expected top production of 500 B/D.	Improved McCullough 4¼" M-3 Burrless Bullet Perforator. Eight hundred seventy holes shot through 7" cemented casing at about 6000 feet in thirteen hours.	**0 B/D to 1000 B/D** A mighty fine well!!

OPERATORS ENTHUSIASTIC OVER RESULTS WITH NEW AND IMPROVED McCULLOUGH PERFORATORS. From field after field, reports are coming in. Unsolicited reports from customers so well pleased they want to tell us about it.

FIND OUT WHAT UP TO 25% DEEPER PENETRATION CAN DO FOR YOU. Call your McCullough Service Engineer and get the facts. Ask him or write today for the new factual, thirty-two page booklet "HOW TO GET MORE OIL."

PERFORATING, RADIATION LOGGING, AND FISHING TOOL SERVICE—ANYWHERE—ANYTIME.

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CANADA: Edmonton, Calgary, Grande Prairie, Alb.; Regina, Saskatchewan
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SERVICE LOCATIONS: TEXAS: Houston, Snyder, Alice, Cisco, Corpus Christi, McAllen, Odessa, Tyler, San Angelo, Victoria, Wichita Falls, Luling, Beaumont, Sherman, Midkiff, El Campo. **OKLAHOMA:** Oklahoma City, Guymon, Healdton, Hominy. **ARKANSAS:** Magnolia. **MISSISSIPPI:** Laurel. **NEW MEXICO:** Hobbs. **KANSAS:** Great Bend. **WYOMING:** Casper. **CALIFORNIA:** Los Angeles, Avenal, Bakersfield, Ventura. **LOUISIANA:** Houma, Lake Charles, New Iberia, Shreveport. **COLORADO:** Sterling. **NORTH DAKOTA:** Williston. **UTAH:** Vernal.

WORLD PETROLEUM for June, 1953. Vol. 24, No. 6. June, 1953. WORLD PETROLEUM is published monthly by Mona Palmer, Trustee under the will of Russell Palmer, 604 Fifth Ave., New York 20, N. Y. Acceptance at East Stroudsburg, Pa., under Section 34.64 P. L. & R. Authorized. Subscription rate: $5.00 per year, single copies $1.00. Copyright 1953, by Mona Palmer, Trustee.

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Electric Weld
LINE PIPE
Uniformly satisfactory in service because—
Long lengths save time and trouble
Weldability is outstanding
It bends readily
Line up characteristics are excellent

QUALITY YOUNGSTOWN SERVICE

FOR TOP QUALITY PIPE

●All steel for Youngstown Electric Weld Pipe is of predetermined analysis—produced in the open hearth by closely controlled blending and refining of specially selected scrap, molten pig iron and high purity limestone. The result is uniform dependability.

Youngstown Electric Weld Pipe for the oil and gas industry is being made in sizes up to 22" OD and in grades as high as X52. For further information, phone or write our nearest District Sales Office.

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The "Success Story" that can never be finished

The time was June 1928. Gulf had just introduced a revolutionary new motor oil—made possible by the invention of a new refining method. This remarkable new oil, which exceeded every quality standard of that day, was called Gulfpride—and was acknowledged to be "The World's Finest Motor Oil."

HERE was a motor oil so advanced there might well have been a temptation to leave it alone. But Gulf believes in this simple axiom: A good product is merely the beginning of a *better* product.

The development of that original Gulfpride was only the beginning of a program of persistent research that has continued over the past quarter-century.

Gulfpride has been improved again and again—to keep it well ahead of the increasingly exacting demands of advancing engine design.

Most recent result of this program of constant improvement is Gulfpride H.D., the remarkable high detergency motor oil.

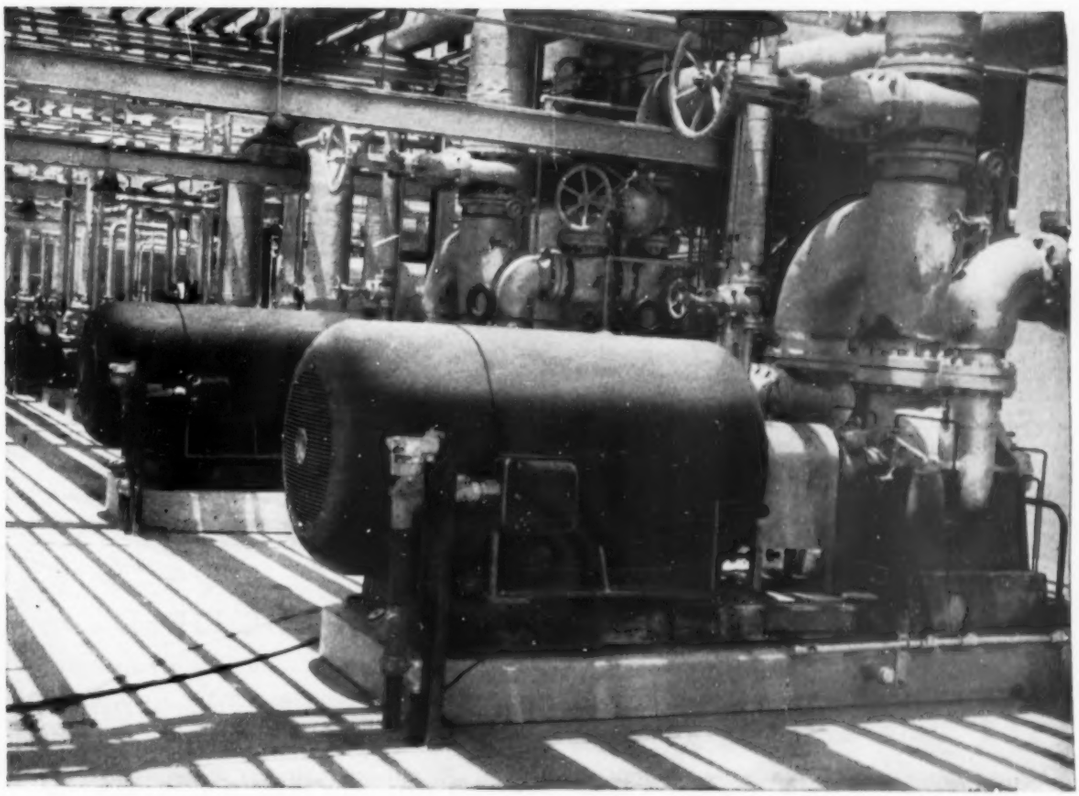
And already, Gulf research technologists are again seeking new ways to make this fine product even better . . . new ways to make sure that Gulfpride will always be "The World's Finest Motor Oil."

Gulfpride

For Twenty-five Years . . .
THE WORLD'S FINEST MOTOR OIL

Gulf Oil Corporation • Gulf Refining Company

REFINERY BENEFITS YOU CAN COUNT ON



Give G-E totally-enclosed motors your hard jobs . . .

They Give You Top Performance Under Hazardous Conditions

Expect maximum safety and peak efficiency from General Electric totally-enclosed motors . . . wherever you put them to work in your refinery, indoors or outdoors. After years of research and testing, G-E now offers the most extensive line of standard and explosion-proof types available today. In the widest variety of types and sizes, these motors serve dependably in atmospheres containing: gasoline, petroleum, naphtha, alcohols, acetone, solvent vapors, natural gases, etc.

Available in accepted industry standards, G-E totally-enclosed motors can do your hard jobs for you safely, efficiently. See your G-E representative for information. Or write for FREE catalogue GEA 4400A to: International General Electric Co., 570 Lexington Ave., New York 22, N. Y., U.S.A. 1A-52-7E

SAFER!

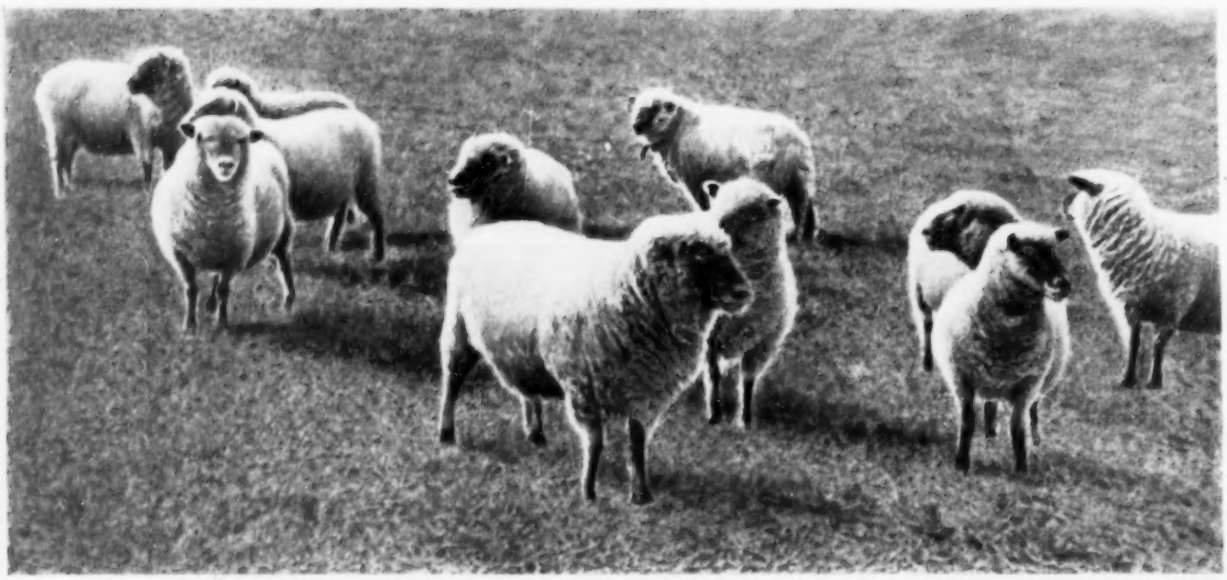
G-E explosion and dust-explosion-proof motors are built specifically for use in these hazardous locations. Carefully machined flame paths, non-sparking Textolite fan insure this safety.

STURDIER!

- Cast-Iron Construction
- Double-Shell Frame
- Easily-Relubricated Bearings
- Always-Legible Nameplate
- Large-Grease-Capacity Bearings
- Dirt-Barring Labyrinth Seal

You Can Put Your Confidence In—

GENERAL ELECTRIC



The opportunity will be extended to local farmers to graze sheep on the 125-acre natural gas storage field located ten miles north of the District of Columbia

Picture of a NATURAL GAS STORAGE FIELD

Managements faced with the problem of increased peak demands for natural gas beyond normal supply capacity, as well as providing stand-by capacity, can benefit from Stone & Webster Engineering Corporation's knowledge in this field.

For the Washington Gas Light Company the Engineering Corporation designed and constructed underground high pressure natural gas storage facilities with propane storing and mixing equipment, giving the Company, in addition to its other facilities, the equivalent of 100 million cubic feet of gas available for stand-by and peak shaving.

The new Washington Gas Light Company storage field is one of a number of high pressure pipe gas storage fields that Stone & Webster Engineering Corporation has designed and built for its clients.

The Corporation has also designed and built gas compressor stations, and has made studies for clients on peak shaving problems involving catalytic reforming of hydrocarbons, natural gas liquefaction and other processes. This broad experience is available to the gas industry.

STONE & WEBSTER ENGINEERING CORPORATION

BADGER PROCESS DIVISION

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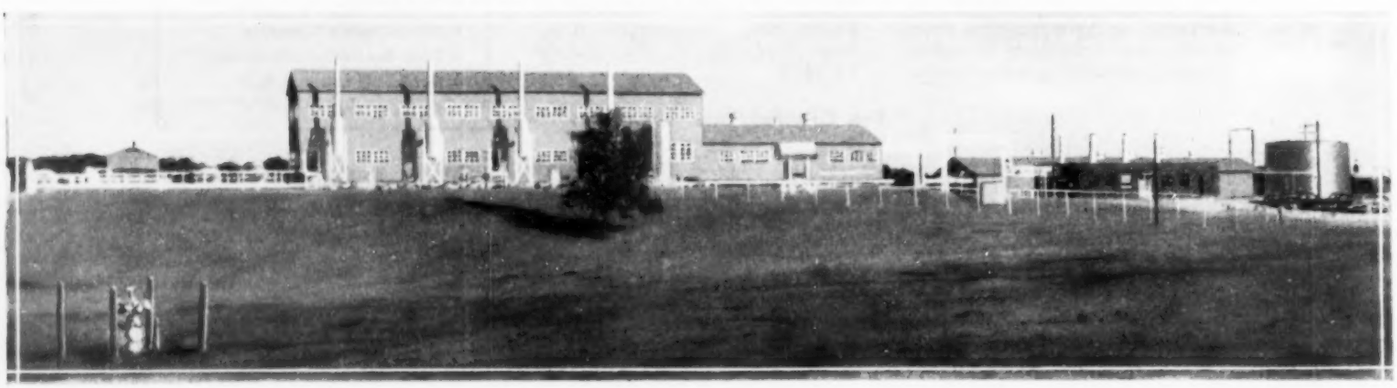

Around-the-clock

TEAMWORK

Night and day the oil operations go on in Saudi Arabia. Thousands of Saudi Arabs teamed with Americans are developing the vast oil resources.

Driller Forrest Cathey of Kansas and his assistant Hassan ibn Mohammed of Dhahran work the night shift on this structure drill in the Arabian desert. In office, plant and field, Saudis learn the oil business under the guidance of American oil men.

Arabian American Oil Company

DHAHRAN, Saudi Arabia NEW YORK, U.S.A.

The best
FIRE FIGHTING FOAM
for Oil Fires . . .

We—the largest manufacturers of Mechanical Foam fire extinguishing systems in the world—offer a *complete* range of Fire Fighting Equipment for Oil Refineries and Tank Farms.

"Pyrene" Foam Compound is the outcome of many years of scientific research in our laboratories and practical tests on a great number and variety of fires.

"*Pyrene*" *Standard Grade Foam Compound* used with the skilfully designed and accurately calibrated "Pyrene" Foam-making Branchpipes or "Pyrene" Mechanical Foam Generators, provides a stable, tenacious and heat-resistant foam of the very highest quality.

A special "*Pyrene*" *Alcohol-Resistant Foam Compound* has also been developed, which is highly effective in extinguishing fires involving alcohols such as methanol, iso-propyl alcohol etc. Its water rate is identical with that for hydrocarbon fires where "Standard" foam compound is used.

There is no room for doubt—the most efficient and dependable foam protection against all Oil and Spirit fire risks

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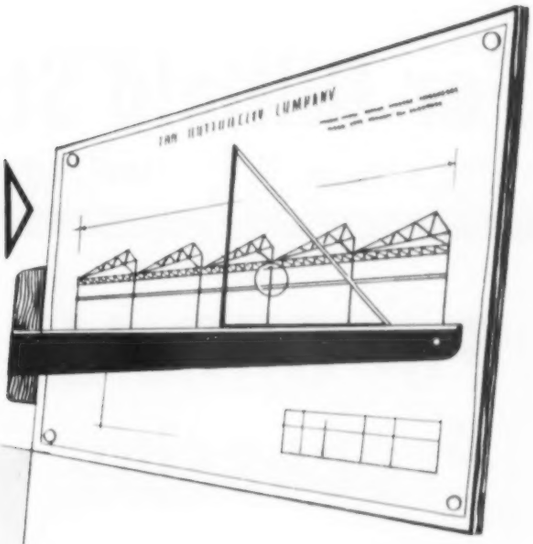

to erection on site

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BUTTERLEY

Constructional Steelwork

The Butterley Company has been engaged in constructional steelwork from its early days and examples are to be found in all parts of the British Isles and in many countries overseas. From design, through the stages of fabrication to erection on site, every structure is invested with the skill and knowledge which have made the Butterley Company famous in the field of constructional steelwork. Welded methods are widely employed today and the shops are well-equipped to undertake the largest and heaviest work of this nature.

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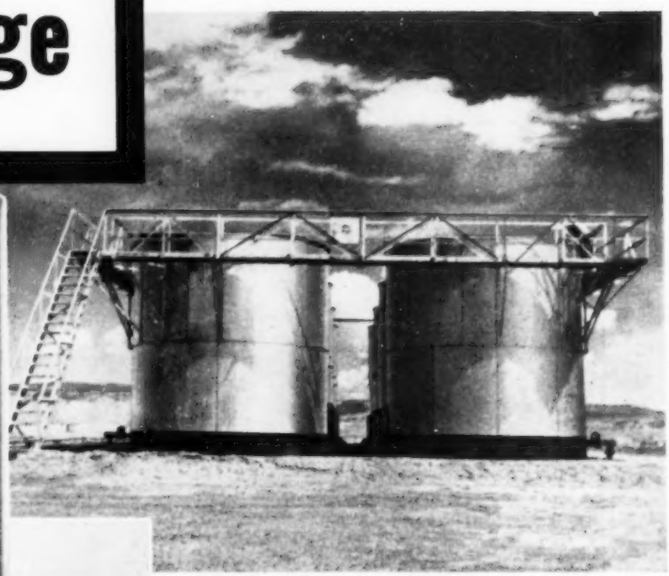
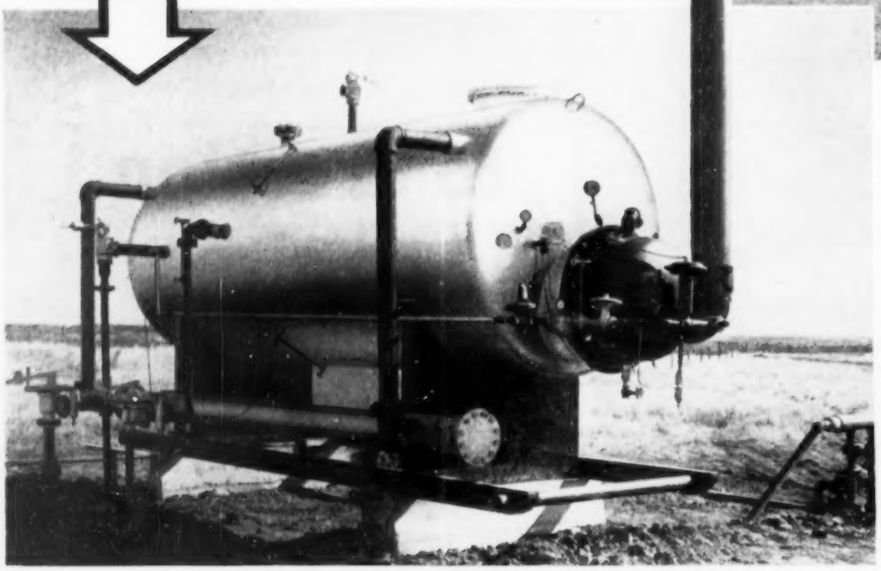
For Oilfield Storage



For Oilfield Processing



Specify BS&B

BS&B Equipment is paying off for oil and gas producers the world over. They have learned to count on BS&B for the equipment that will provide operating efficiency, economy and reliability . . . and here's why:

60 Years Experience in the petroleum business has given BS&B a chance to develop and prove many important oil field advancements. BS&B engineers have the training and the long background of service that means consistently correct recommendations. Those two important advantages backed by the best of fabrication facilities are the reasons why every year more and more operators are relying on BS&B equipment to bring them added production profits.

BS&B Welcomes Your Inquiries, whether your project is large or small. Let us apply our technical knowledge to your problem.

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EFFICIENCY
OUR 60TH YEAR
BS&B
RELIABILITY

THE *All-Bethlehem* DRILLING RIG

A workhorse with *get-up and go*

Each of the many components in a Bethlehem turnkey drilling rig embodies the latest advances in engineering — something very important, in view of the loads imposed by modern drilling. And all the components are designed for top performance at any speed. A Bethlehem rig gives you "balanced" operation — harmony and smoothness from crown block to drill bit. There are no mismatched elements anywhere.

You'll find that Bethlehem equipment is conservatively rated, with more than ample reserve for peak demands. You'll find, too, that a Bethlehem rig is a workhorse, one that requires no coddling; one with *go* from the minute you start the engines.

So next time make it an all-Bethlehem outfit — Bethlehem drawworks, slush pumps, swivel, rotary — everything. We have the proper rigs for shallow, medium, or deep-hole drilling, whichever your needs call for. Write for information; complete details will be sent promptly.

In addition to its full line of drilling equipment, Bethlehem manufactures a wide range of pumping units for production work.

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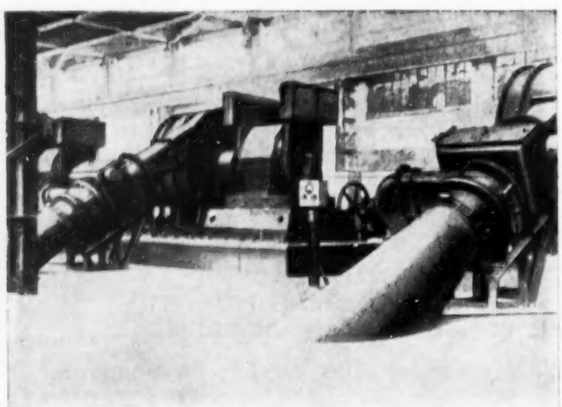
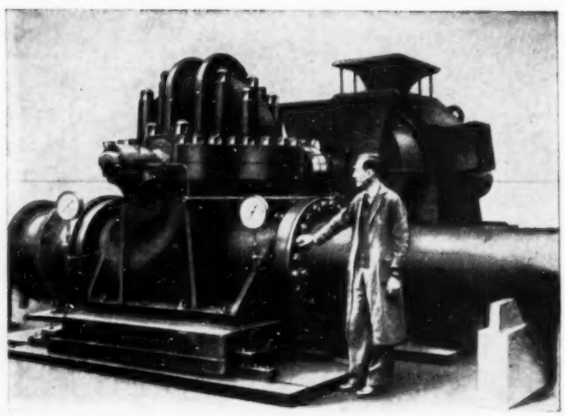
Mather & Platt Limited

MANUFACTURERS OF

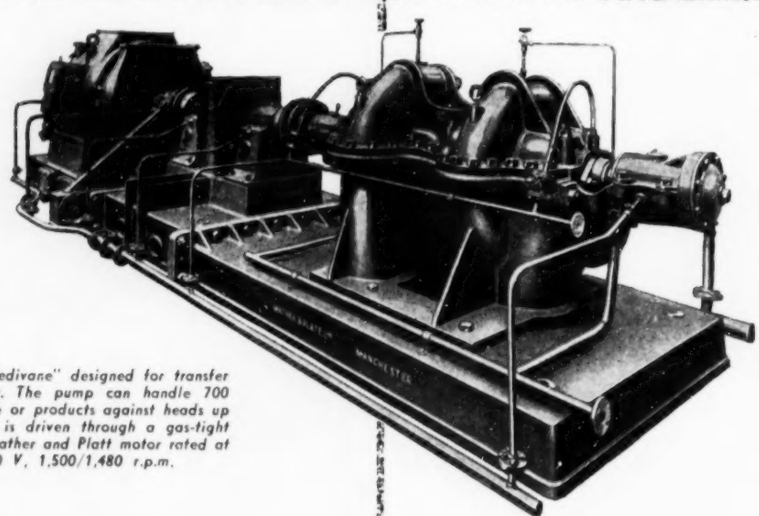
CENTRIFUGAL PUMPS, ELECTRIC MOTORS AND GENERATORS FOR ALL REFINERY AND PIPELINE DUTIES



Mather and Platt motors driving 42" supercharged blowers in a Middle East station. The motors are of the squirrel cage direct-on started type, with a starting current not exceeding 4 times full-load. They are rated at 300 h.p., 3,000 r.p.m. 3,300 V, and in all nine motors were supplied for this duty.



This photograph, taken on our Works Test Bed, shows a Mather and Platt Medivane Pump designed for crude oil pipeline duty. The designed performance of the pump was 14,280 g.p.m. (588,000 bbls/day) against a 549 ft. hd. at 1449 r.p.m.



A two-stage "Medivane" designed for transfer or loading duty. The pump can handle 700 tons/hr. of crude or products against heads up to 500 ft., and is driven through a gas-tight wall-box by a Mather and Platt motor rated at 550 b.h.p., 3,300 V, 1,500/1,480 r.p.m.

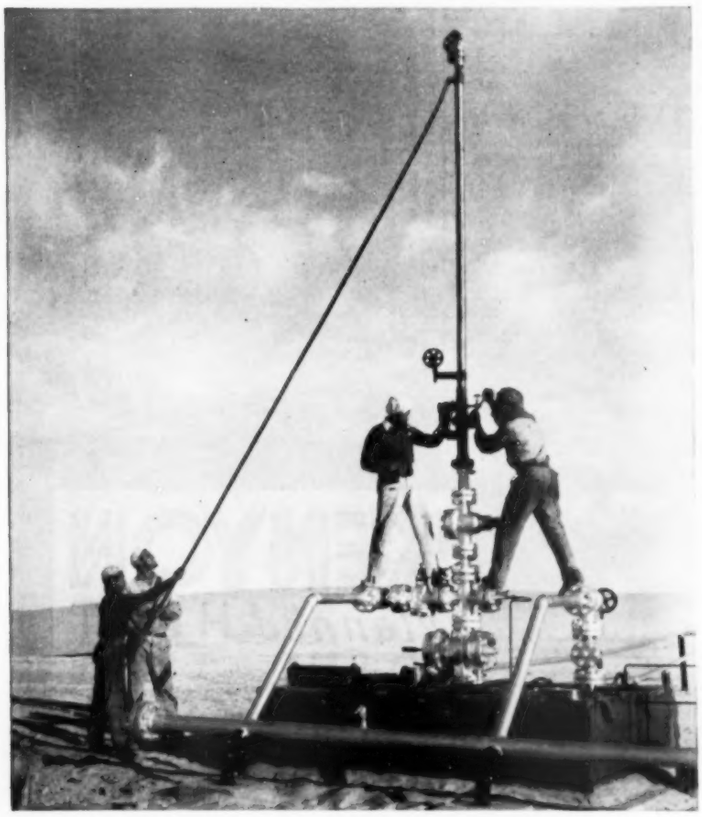
238

MATHER & PLATT LTD

PARK WORKS MANCHESTER 10
Park House Gt, Smith St, London S.W.1

Chemist draws sample from press in large British refinery. Lines carrying lubricating oils are controlled by Audco-Nordstrom valves.

Operators install Audco-Nordstrom equipped Christmas tree in an Arabian field.



HERE ARE THE BASIC ADVANTAGES OF A *Lubricated* VALVE

There's nothing complicated about valve lubrication. It affords certain very basic advantages not found in a non-lubricated valve:

MOST POSITIVE SEAL

The pressurized film of lubricant in an Audco-Nordstrom makes a tight, leak-proof seal that is impossible to attain by pressing two pieces of metal together.

RESISTANCE TO WEAR

No matter how smooth the surfaces are at first, extended metal-to-metal friction results in abrasion that wears away the vital seating surfaces of a non-lubricated valve. In an Audco-Nordstrom, the entire contact surfaces are protected from abrasion by a film of lubricant.

RESISTANCE TO CORROSION AND EROSION

The corrosive and erosive action of many line fluids eats away unprotected metal. The seating surfaces of an Audco-Nordstrom valve, protected by a film of lubricant, are never exposed to the line fluid.

QUICK, EFFORTLESS OPERATION

Valves that depend upon wedging for a seal require greater effort to operate because the pressure that produces the seal must be overcome when the valve is turned. Audco-Nordstrom Lubricant-Sealed valves operate easily and quickly because the plug slides on a film of lubricant.

These reasons show why Audco-Nordstrom valves are your best buy. For year after year of steady, efficient operation, install Audco-Nordstrom valves.

AUDCO and Nordstrom

BRITISH

AUDLEY ENGINEERING COMPANY, LTD.

Newport, Shropshire, England

OVERSEAS AGENTS located in South Africa, Australia, India, Trinidad, British West Africa, Finland, Norway, Sweden, France, Belgium, Switzerland, Italy, Spain and Portugal.

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WHERE THERE IS NEED OF HEAT INSULATION

Kenyon provide a *complete* thermal insulation service to the oil industry, including technical advice on thermal insulation specifications, and finishes for all conditions. Supply of materials, application, supervision, on sites throughout the world.
The photograph shows view of furnaces on Pyrolysis Unit, Shell Chemical Plant, Stanlow, Cheshire, England.

A Shell Photograph

WM. KENYON & SONS (AMERICA) LTD., PERTH AMBOY, N.J., U.S.A.

WILLIAM KENYON & SONS LTD., DUKINFIELD, CHESHIRE, ENGLAND

Seal in All Your Horsepower

with the Veedol Motor Oil "Film of Protection"

GET all the horsepower engineered into your powerful modern engine. Seal in the great performance your car can give . . . with the famous VEEDOL "Film of Protection."

VEEDOL Motor Oil *seals in* horsepower by resisting blow-by! It contains detergent additives that suspend contaminants, leaving your engine cleaner after draining. And it combats the metal-eating action of "engine sweat" by forming the famous anti-corrosion "Film of Protection" on metal surfaces.

Don't waste horsepower! Get VEEDOL Motor Oil and *use* all the power your car can deliver!

TYDOL

TIDE WATER ASSOCIATED OIL COMPANY
New York Tulsa San Francisco

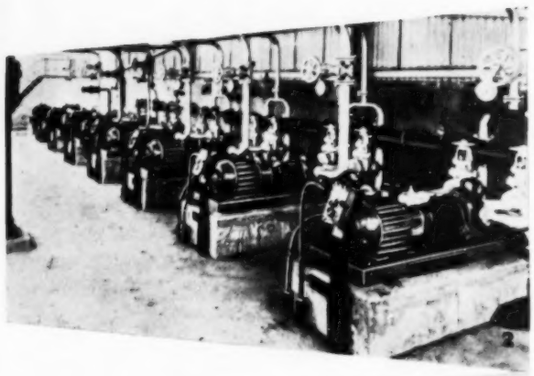
Federal Flying -A- Tires . . .
Good for a long safe ride!

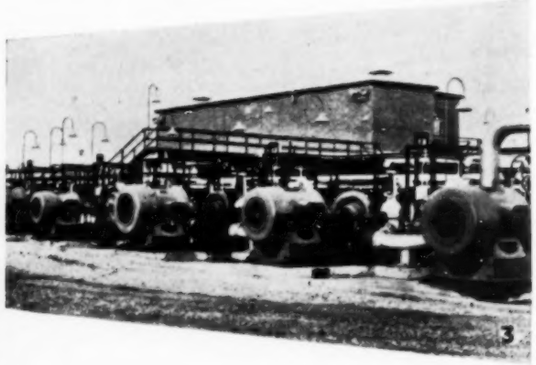
FLAMEPROOF MOTORS

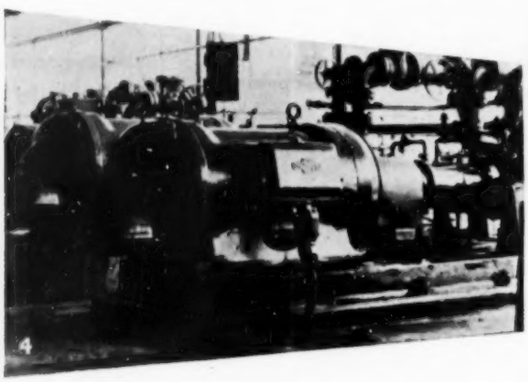
certified for group 2 and group 3 gases

A complete range of Metrovick Buxton-certified flameproof motors is available for refineries and petro-chemical works, for either indoor or outdoor use. Machines with either ball and roller bearings, or sleeve bearings, can be supplied, and all are suitable for hot product pumps.

A specialised range of splash-proof well-pump motors and industrial type machines for non-hazardous locations is also available.







1. *A range of flameproof motors in one of the main pumping stations at Scottish Oils, Grangemouth Refinery.* 2. *Type KFB flameproof motors driving Sigmund pumps at Shell Stanlow Refinery.* 3. *300-600 hp outdoor flameproof motors at the product loading station at Esso Refinery, Fawley.* 4. *125 hp 3500 rpm T.E.F.C. motors driving oil pumps at Trinidad Leaseholds Pointe-a-Pierre Refinery, British West Indies.*

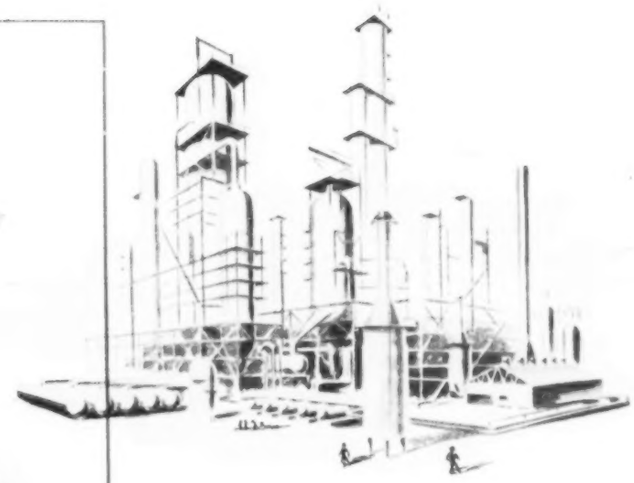
METROPOLITAN-VICKERS ELECTRICAL COMPANY LIMITED
Member of the A.E.I. group of companies
TRAFFORD PARK · MANCHESTER, 17

METROVICK *Motors Serve the Oil Industry*

J/M301

a new refinery for

INDIA



to help raise the pulse beat of industry

Standard-Vacuum has started to build a full-scale petroleum refinery at Bombay*, at a cost of 35,000,000 dollars.

Each year this new installation will be capable of turning out 40,000,000 imperial gallons of illuminating oil for Indian homes . . . *plus* 250,000,000 gallons of other petroleum products to help turn the wheels of India's industry, agriculture and transport.

The manufacture of these oil products within India's borders will serve to strengthen the economic foundations of her freedom and social progress.

**The refinery will be built and operated by the newly formed Standard-Vacuum Refining Co. of India (Ltd.), a subsidiary of Standard-Vacuum Oil Company.*

STANDARD-VACUUM OIL COMPANY

A name that stands for "Progress" in the East

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SOUTH PACIFIC ISLANDS • SOUTH WEST AFRICA • TANGANYIKA • THAILAND • UNION OF SOUTH AFRICA

IDECO

IS ONE OF THE DRESSER INDUSTRIES

Ideco, one of the Dresser Industries, with offices in Dallas and Beaumont, Texas, manufactures a complete line of oil field equipment for drilling, workover and servicing. Supplemented by accessories and supplies from other Dresser companies, the Ideco organization offers an exceptionally complete line.

MAGNET COVE BARIUM CORP., Houston, Tex., Malvern, Ark. Magcobar drilling mud, Magcogel bentonite, Mylojel, Fiber Seal, Jel-Oil mud.

CLARK BROS. CO. DIVISION, Olean, New York. Engines and compressors—gas, steam and diesel driven.

DRESSER MANUFACTURING DIVISION, Bradford, Pa. Oil and gas pipe couplings, fittings and sleeves—rolled and welded rings—welded fittings and flanges.

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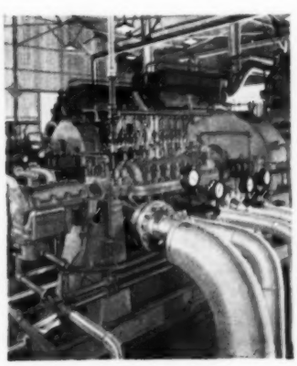

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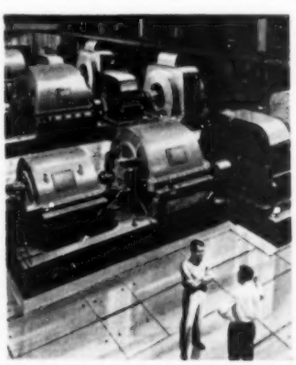

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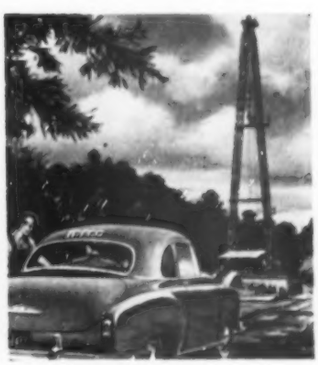

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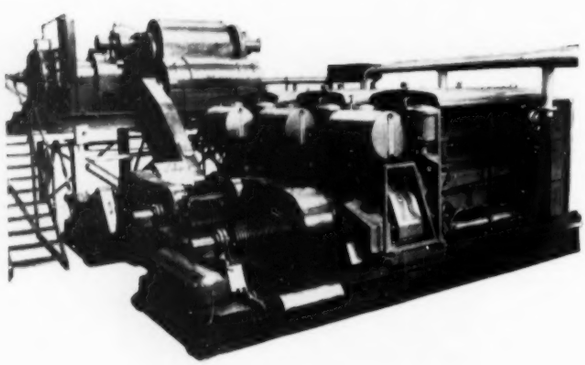

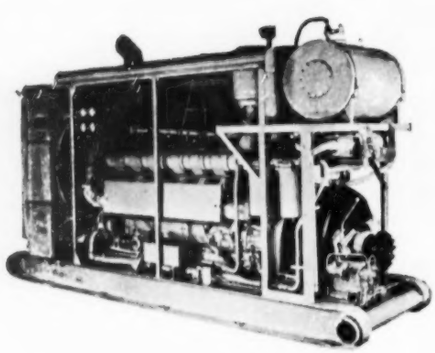

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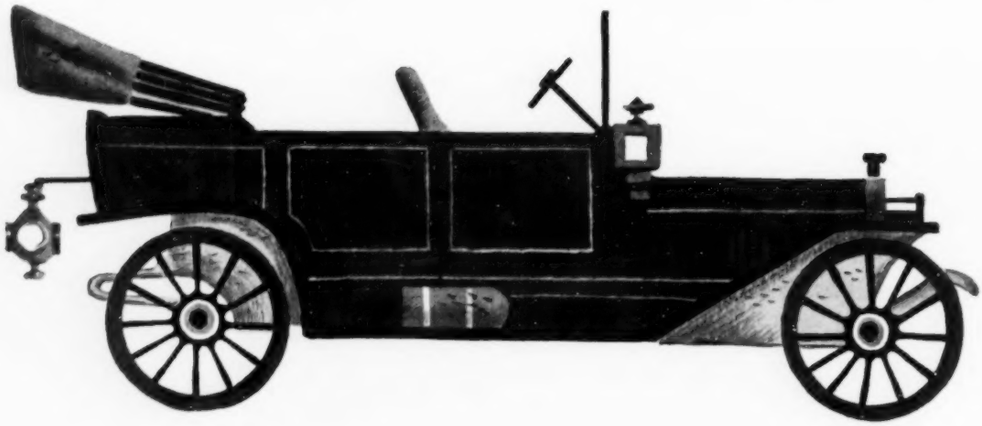
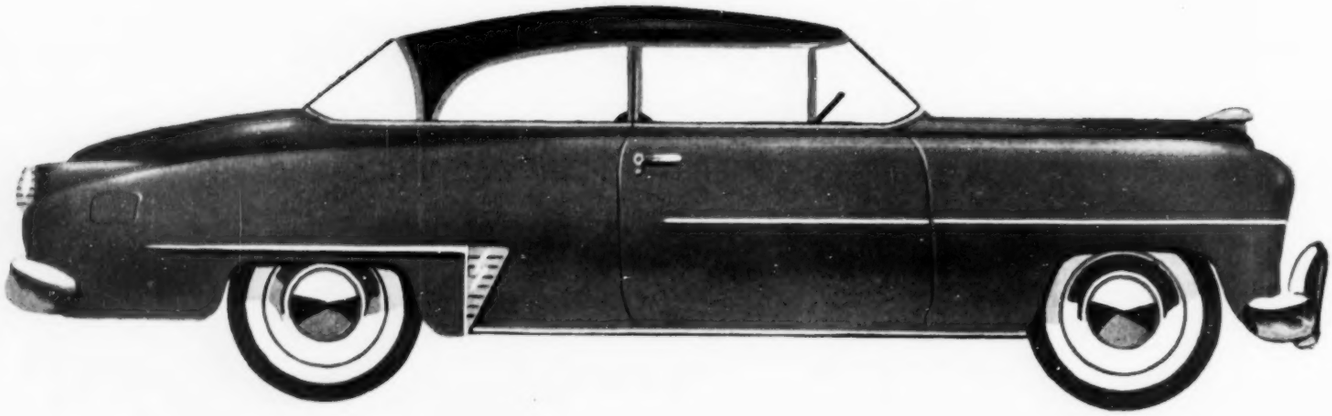


the biggest difference is in the gas tank!



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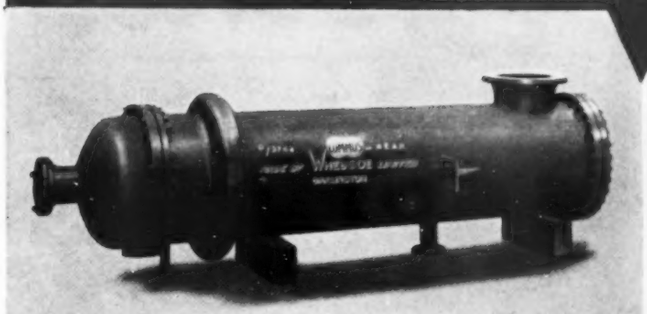
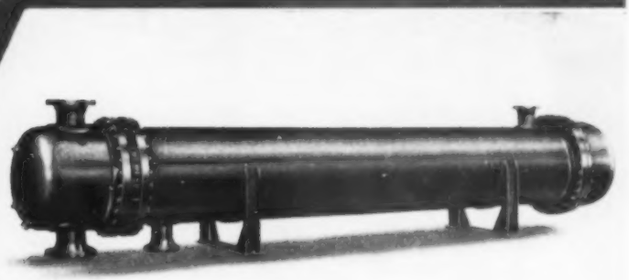


Column Reboiler—single-pass design (32" o.d.) of mild steel construction. Test pressures: shell and tubes 225 p.s.i.g.



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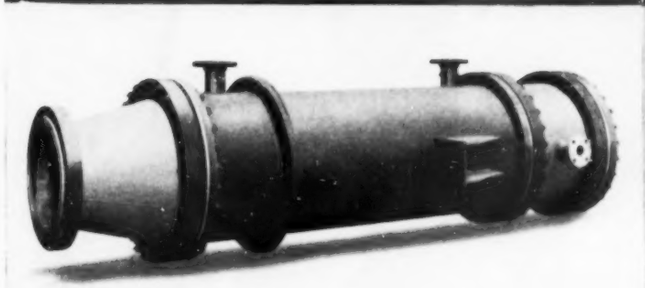

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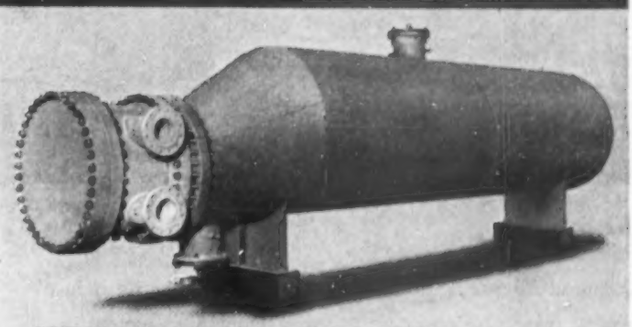

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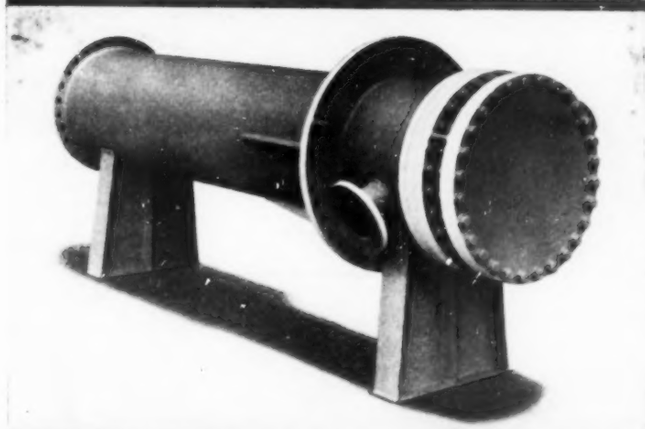

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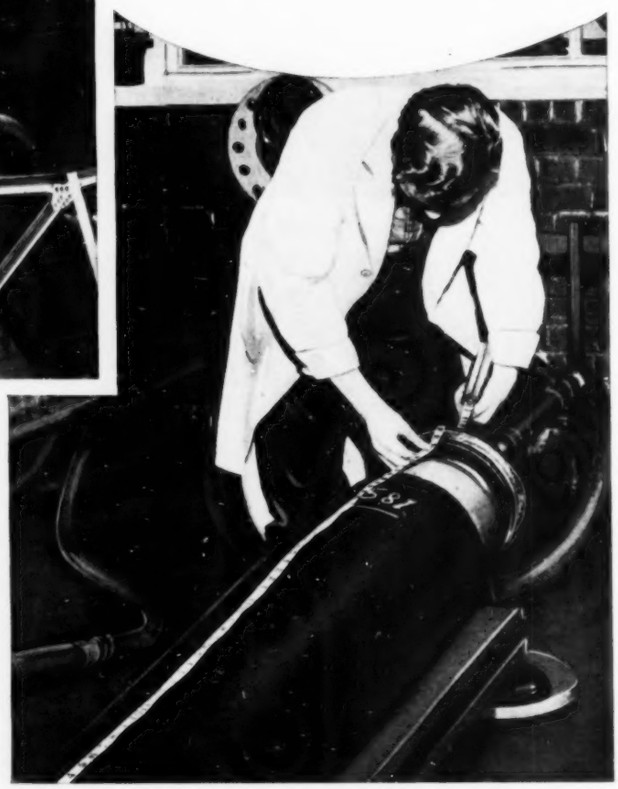

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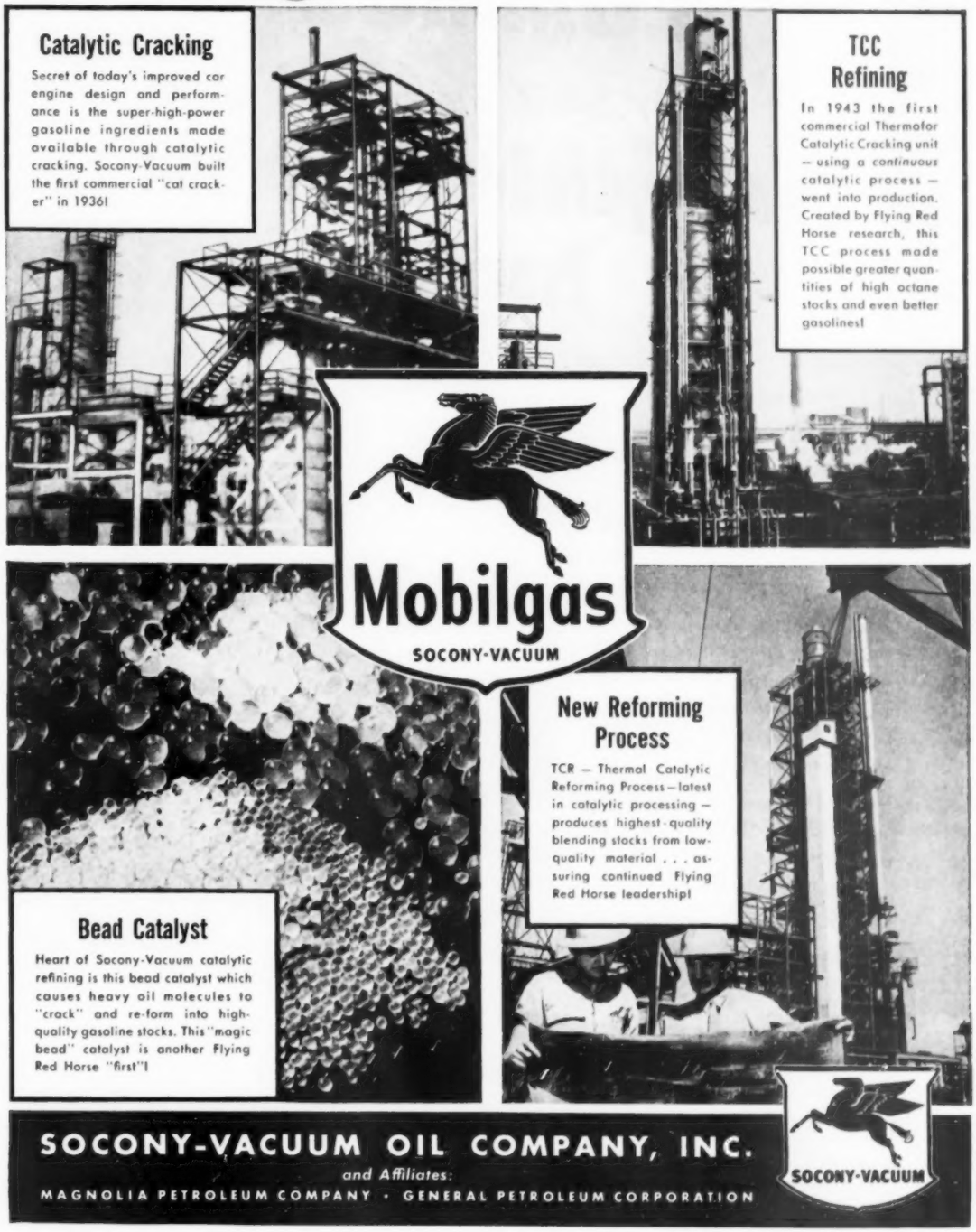
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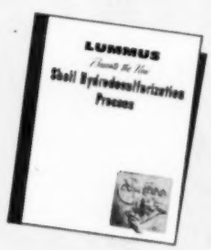

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SUBSCRIPTIONS

Annual subscription $5.00 (U.S.) postpaid
Single copies $1.00

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World Petroleum is published by Mona Palmer, Trustee under the will of Russell Palmer.

VOL. 24, NO. 6
JUNE 1953

World Petroleum

THE MANAGEMENT PUBLICATION OF THE INTERNATIONAL PETROLEUM INDUSTRY

CONTENTS

31 Petroleum: One World

32 Oil Imports: The Great Debate, by Joseph Huttlinger

34 International Petroleum Exposition:
Production Equipment Progress, by W. R. Clarke
Drilling Equipment Progress, by F. A. Street

41 U. S. Imports Discussion Creates Venezuelan "Petroleum Crisis"

42 World Tanker Fleet Shows Rapid Growth, by E. Lawson Lomax

45 U. S. Tanker Fleet Growth Slower Than Other Nations

47 Japanese Shipyards Busy

48 Continued Growth of Oil Industry Reflected in 1952 Annual Reports

52 Schlumberger Opens New Headquarters Plant at Houston

54 The National Interest in Reserve Producing Capacity, by J. E. Brantly

58 Western Canada's Oil Reserves: Part II, by T. A. Link and J. A. Downing

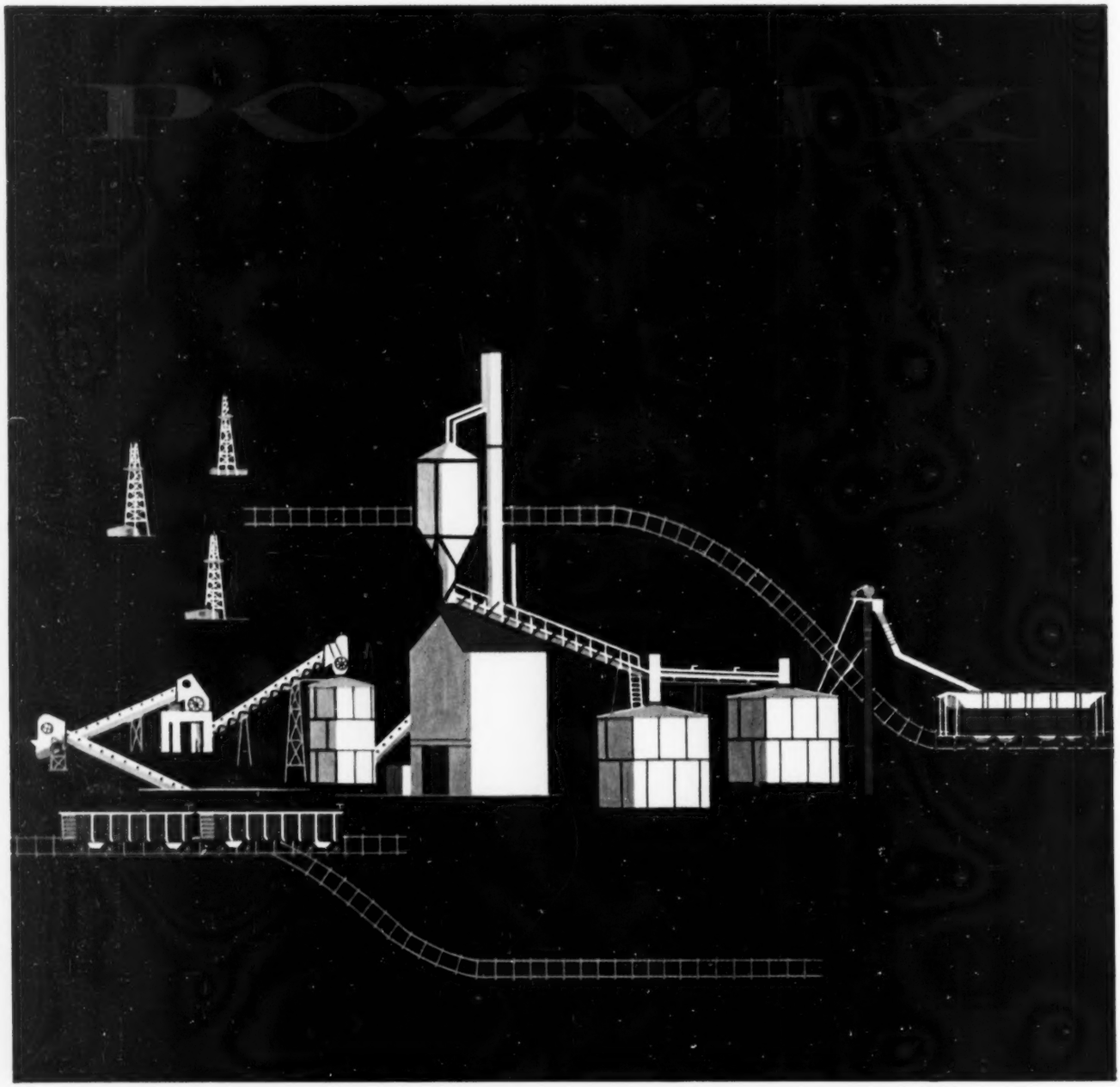
68 Oil Company Staff Changes

72 British Oil News, by E. Lawson Lomax

92 Advertisers' Index

THIS MONTH'S COVER

The Cities Service tanker *Paoli* approaches New York harbor. Photograph was taken from a plane by Charles E. Rotkin. Color plates are reproduced here through the courtesy of *Service*, house magazine of Cities Service Company.



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PETROLEUM: ONE WORLD

PRELIMINARY statistics on oil production and consumption in 1952 indicate that the United States consumed 56.7 percent of the total world usage and produced approximately 51 percent of the total supply. The gap was filled by imports, chiefly from South America. The Western Hemisphere as a whole provided 71 percent of world supply and absorbed 68 percent of the product, leaving a relatively small surplus for shipment overseas.

Next to the United States, the largest consuming area is Europe, which used 21.5 percent of the total output with only 9.4 percent of production. Excluding the Soviet zone, which absorbs all of its own production and is not a factor in international oil trade, Western Europe accounts for slightly under 15 percent of total consumption with less than two percent of output. On the other hand, the Middle and Far East, with an outturn of 19.6 percent of global production, use only 7.5 percent internally.

This situation of course is not static. Changes take place from year to year, sometimes with surprising rapidity. Production in the Middle East has been multiplied fivefold in the past decade owing to the rapid development of great fields in Saudi Arabia, Kuwait and Iraq within that period. While consumption in the United States has grown during recent years at a rate much higher than that which had come to be considered normal, the increase percentagewise has been even more rapid in the rest of the world. At the present time, the highest rate of expansion in demand is being recorded in what may be broadly defined as the Pacific quarter of the globe, including southeastern Asia, Oceania and Japan, and is leading to a marked expansion in all branches of the industry in that area.

Broadly speaking, however, the general pattern of the industry and its trends are fairly well defined. Everywhere the picture is one of progress, but the rate of advancement varies from region to region and year to year. As late as the end of World War II, the United States was supplying roundly two-thirds of the world's oil, while now the proportion is slightly more than one-half, although the actual volume of output has risen by 40 percent in the intervening period.

One fact emerging clearly from a survey of the oil situation is that the industry is becoming more and more international in character, and that it is essential to preserve its global status and to guard its development, not only for the security of the free world to which it is a basic necessity, but also for the economic and industrial development of all nations that come within that category. In governmental discussions of international oil affairs in recent years, there have been attempts to arrive at agreements among leading nations to control and regulate production and distribution of oil and its products. Such agreements are unnecessary and if undertaken would be positively harmful to the progress of the industry. It has flourished and grown great through its competitive character and its dependence on private initiative and enterprise. It has demonstrated on many occasions its adaptability to changing conditions. Its management has shown a growing awareness of the need to eliminate wasteful methods of operation and to strive unceasingly for technical improvement of its practices and its products. The one essential is a more complete recognition of the interdependence of the industry and its position as the bulwark of safety and progress for the free world. That world needs for its future preservation and strength all the hydrocarbon resources that it now possesses or is likely to develop. This is the one policy to which all progressive nations should be committed.

Looking ahead, it is obvious that the changes and trends now in evidence will continue to make themselves felt in the future. As an example, the President's Materials Supply Commission in its recent report endeavored to project the pattern of world supply and demand for a quarter century. Its study suggested that by 1975 American production, under the most favorable conditions and including shale and coal utilization, might reach 11.2 million barrels daily, but that this would fall short of consumer requirements of that time by probably 2.5 million barrels per day. For the rest of the world, it estimated a 15 million barrel daily requirement, a fourfold increase, much of which would have to come from areas now dangerously exposed to aggression.

While these figures are indicative only, the point which the report makes with clear validity is that, so far as petroleum is concerned, there is but one world and its preservation is a vital necessity.

OIL IMPORTS— the Great Debate

By Joseph Huttlinger

THE PROBLEM of where to sell petroleum, not where to find it, is the oil issue of the day. In Washington, the current oil oversupply is sparking a lively battle for and against a law to slow down oil imports to the United States.

Pressing for a law are domestic petroleum and coal producers and others. Coal men say residual fuel oil imports are taking their market, so that coal mines are closing. Petroleum producers say their production is down 400,000 barrels a day from last winter, while imports are above a million barrels of oil every day. A quota on oil imports is the only answer, both groups agree.

Compared with a year ago, the reduction in crude production is approximately 100,000 b/d and is confined almost entirely to Texas. In the first quarter of this year, total U. S. production was well ahead of the same period last year, but in April the Texas cut brought the level below 1952.

At the end of April, Kansas, Oklahoma, North Dakota, Louisiana, New Mexico, Wyoming, Montana, Colorado and California were producing more oil than a year ago. Texas output was down 250,000 b/d and all other states were up nearly 150,000 b/d.

Spokesmen for petroleum and coal producers went before the House Ways and Means committee May 11 and 12. The coal men asked Congress for a law to restrict imports of residual fuel oil to five percent of domestic demand. This means 76,000 barrels a day instead of 351,000. Petroleum spokesmen asked for a ceiling on crude oil and product imports of 10 percent of domestic demand. This means 728,000 barrels a day.

Doing the bulk of the testifying were Tom Pickett, executive vice-president of the National Coal Association, and Russell B. Brown, counsel of the Independent Petroleum Association of America. The IPAA was created 23 years ago to fight oil imports. They testified on bills to extend but amend the reciprocal trade agreements program. They want the oil quota ceiling added to the trade agreements act.

At least 30 members of Congress have introduced legislation to set oil quotas. Rep. Richard Simpson, R., Penna., number two man on the House Ways and Means Committee, is one of these. His bill, regarded as the committee bill on reciprocal trade, would contain both oil quotas, change "peril point" and "escape clause" provisions, and give the U. S. Tariff Commission, not the State Department, paramount authority.

President Dwight D. Eisenhower and his Cabinet oppose all efforts to set a quota ceiling on oil imports. Officials of the State, Interior, Treasury, Commerce and Agriculture Departments made this clear in testimony. Instead, they propose an extension of the trade agreements program for one year; during the year, they promise, the President would set up a foreign trade commission to study what harm, if any, is being done all American industries by "excessive" imports.

On May 13 and 14, oil industry and other spokesmen opposing oil import quotas had their day before the committee. Officials of these, among other companies, spoke up: Standard Oil Co., N. J., Socony-Vacuum Oil Co., the Texas Co., Standard Oil Co. (Calif.), Gulf Oil Corp., and the National Oil Jobbers Council along with other oil marketing associations. They expressed agreement that any such oil quotas would mean higher prices for petroleum products, the threat of shortages, harm to earnings of foreign countries and foreign oil operations, less market for American farm produce abroad, and harm to the U. S. national security. The residual oil quota would be the worst, they agreed; they foresaw certain shortages of this heavy fuel oil in the event of the five percent quota.

As the IPAA's Brown sees it: "A surplus of foreign oil is developing. As cheap alien oil floods the United States, state conservation bodies will be forced by lessened demand for their states' oil to make further cutbacks."

As Jersey Standard sees it: "Jersey believes the adoption of restrictions which have recently been proposed on oil imports would injure fuel users, consumers generally, American export trade, national defense and free world strength."

The most tart comment came from Otis H. Ellis, counsel of the National Oil Jobbers Council. Of American oil producers, he said: "The plain, unadulterated truth is that they are seeking, by regulatory legislation, to make another buck."

Going far in the inter-industry disagreement, the jobbers voted to ask Congress to shave down the American oil producers' depletion allowance for income tax purposes if the allowance is stimulating a world surplus of petroleum. Further, they voted to ask Congress to study the cost-profit structure of the domestic industry.

On one point, the whole American petroleum industry is agreed. That is that oil imports should be at a level to supplement, not supplant, domestic production. No one, however, can say just what that level is. One member of Congress says the point has been passed when the price of American crude oil drops. One oil man says the test is when drilling falls off. Another oil man says that the level is reached when any barrel of American oil is shut in for want of a market. As for an exact figure, no one has hazarded an opinion.

Coal consumption in the United States has been on the decline for a decade, but the change has been shown to be largely technological. Railroads, in shifting to diesel power, have been an important factor; work stoppages in the coal mines and in the steel industry have cost the coal people much business. Natural gas also has been a recent strong competitor. Heavy fuel oil consumption increase was in proportion to the growth of national energy use.

Yield of heavy fuel at U. S. oil refineries has been declining since the war as cracking has increased. Result today is that a deep cut in residual oil imports would create acute difficulties for fuel consumers. There is not enough heavy crude in the United States to supply the demand and domestic refineries are not geared to

produce residuals. Importers assert that residual imports are supplementary and do not displace domestic oil.

While a large bloc of American petroleum producers are at odds with oil importing companies over whether oil imports are supplanting domestic production, there are further disagreements in the industry. Within the ranks of American producers are many who oppose the idea of a law to correct the situation. The Texas Independent Producers and Royalty Owners Association, for one, is for lower oil imports, but wants importing companies to cut back by voluntary independent action. Agreeing with TIPRO are some prominent voices close to American producers. They believe imports are too high, but oppose a law to correct things.

J. Ed Warren, deputy administrator of the Petroleum Administration for Defense, recently asked importers to cut back their flows to the U. S. in a public speech. In response, some cutbacks were announced. Jersey Standard said it was reducing imports by 18,000 barrels daily; Socony-Vacuum, 5,000; Texaco, 5,000; and Gulf, 6,200. This was not enough, however, to satisfy the IPAA.

A compromise effort continues, but where it will get is yet to be seen. President Eisenhower considered inviting oil importing companies to the White House to talk it over. As this was under study, the Justice Department filed its new civil antitrust action against five major American oil companies as if to remind everyone of the antitrust laws. The complaint accused the five of bringing in too much oil at times to displace American production, and too little at other times to jack up the price. Faced with such charges, only a daring oil company would sit around a table to confer about oil imports with other companies. A specific law, granting exemption from the antitrust laws for concerted action to hold down imports, appeared to be the only way this could be done.

A meeting of President Eisenhower with governors of oil producing states once was planned, but this turned into a meeting between the President and Governor Dan Thornton of Colorado. At the end of it, the Governor said he and the President were concerned about oil imports and the health of the domestic industry, but they thought other ways than legislation could be found to resolve the problem.

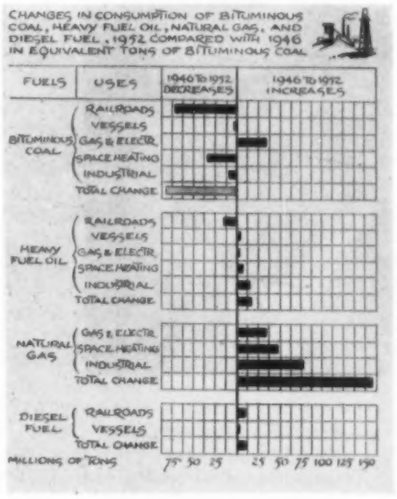
These, then, are the forces and the angles as the industry advises Congress both ways on oil imports. Before the Congress is finished—in June or July—more ideas may be suggested, and a compromise of some sort be achieved. Observers are laying bets, however, that the Congress will pass no legislation for oil quotas this year in the face of President Eisenhower's opposition. Those members of Congress inclined to favor an oil quota, and there are more than ever before, may change their mind for one reason, if no other. That reason is to give the President a year or so to get the facts from a new foreign trade commission. After that study has been made, and the President gives his views on the problem, the Congress could take another look at the matter a year hence.

New Policy Sought

The drive for a new policy toward American business abroad is taking on steam with the government's new action in the so-called international oil cartel case.

New calls for a modern, clear, national policy on what is legal and what not for foreign operations of American business are coming from leaders of the petroleum and other industries.

Inside the Eisenhower administration,



further, there is ever more concern, if not active study, about ways to clarify this paramount issue in world affairs.

One thought of the advisers close to the President is to create a commission to study overseas operations of American businesses and the laws that govern them, and to suggest revisions, if any are needed, in the laws. End result would be proposed legislation for Congress for enactment, if not this year, by next year.

The idea of advance clearances by government of certain plans and programs of foreign operations of American companies long has been under study. The idea is that if the government gives advance approval, it would not later file an antitrust or other action. Further, only in this way, according to one view, would a company abroad know precisely what it may or may not do under the laws.

P. C. Spencer, president of Sinclair Oil Corp., gave the clearest statement of the matter in an address in April to the National Petroleum Association at Cleveland.

"It seems to me," he said, "that the industry must seek to obtain two definite things from our government.

"First, a revision and restatement of our antitrust laws, geared to modern day realities for both government and business, and, second, a revision and restatement of our foreign policy with respect to oil activities of our nationals in foreign lands, particularly in the Western Hemisphere where the economic and military security of our neighbors is so closely tied to our own."

Mr. Spencer pointed out the difficulties the industry faces in dealing with problems of excessive oil imports and reserve capacity, saying:

"To deal with these problems effectively, we must be able to act, within proper areas, on an industry basis, and this is not now safe to do because of confusion, uncertainty, contradictions and stymies developed under our antiquated antitrust laws and conflicting interpretations and regulations."

In the same vein came a comment from J. S. Leach, chairman of The Texas Co., as the government modified but resumed the "oil cartel" action.

"A civil suit will no more advance the solution of the basic problem involved than would continuance of the criminal proceedings," he said.

"What is needed is a well-defined national policy toward American business operating in foreign countries. This policy should, of course, promote the proved and traditional principles of American competition and free enterprise. Part of this policy should be to vigorously support American business, not undermine it, when it is conscientiously operating within the defined limits of national policy.

"There is now an excellent opportunity for the present administration to develop and state such a policy. It cannot be done by law suits, civil or criminal, or by courts or prosecutors. It could be done by a thorough study of the problem by a group of competent, experienced men, whose only concern is the national interest. We had hoped that our government would seize this opportunity to clarify the position of American business abroad and enhance its own prestige by so doing. It is still not too late to act. We trust the administration will recognize this great opportunity."

On April 9, Attorney General Herbert Brownell, Jr., announced he would file a civil complaint against major American oil companies, accusing them of violations of the antitrust laws. On April 21, he filed the complaint and named these five companies as defendants:

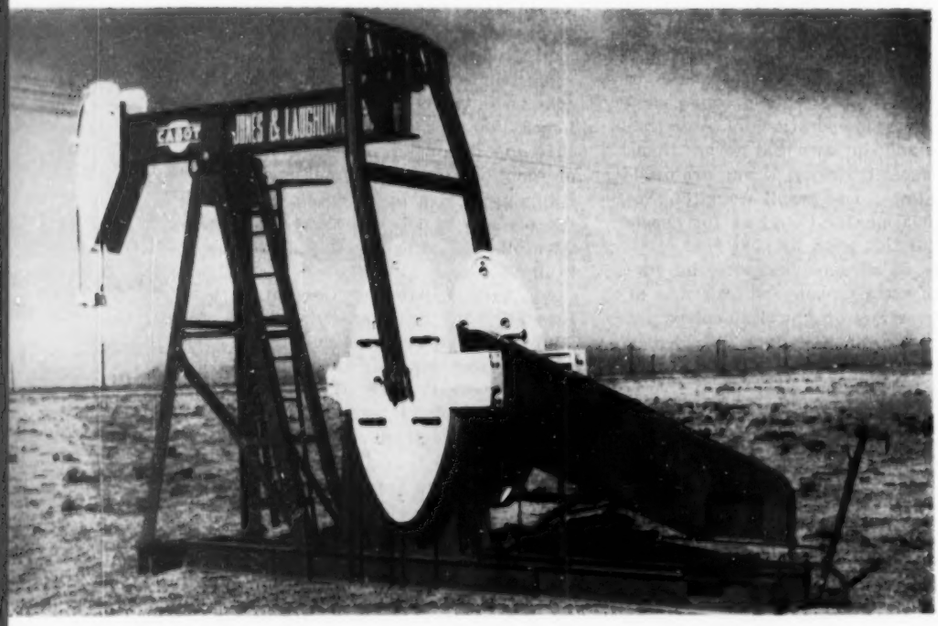
Standard Oil Co. (N. J.), Socony-Vacuum Oil Co., The Texas Co., Standard Oil Co. (Calif.) and Gulf Oil Corp. Significantly, all British and Dutch companies were left out of the complaint, although the Attorney General said other companies

(Please turn to page 86)

Production equipment progress

W. R. Clarke, chief engineer of the machinery sales department, Jones and Laughlin Steel Corp., joined the predecessor Frick-Reid Supply Company following his graduation in 1936 from the University of Oklahoma with an engineering degree. His progress in the company was interrupted by World War II, during which he was in service for five years. He spent three years in the U. S. Air Force in the South Pacific. Returning to Jones and Laughlin in 1945 as salesman, he was promoted to senior city salesman at Tulsa in 1949, and on January 1, 1952 to assistant chief engineer of machinery sales. After seven months in that post, he stepped up to chief engineer. Mr. Clarke is immediate past president of The Engineers Club of Tulsa. He had previously been a director and treasurer of the club.

A good view of the "rubber tail bearing" on the latest style or type of pumping unit.



By W. R. Clarke

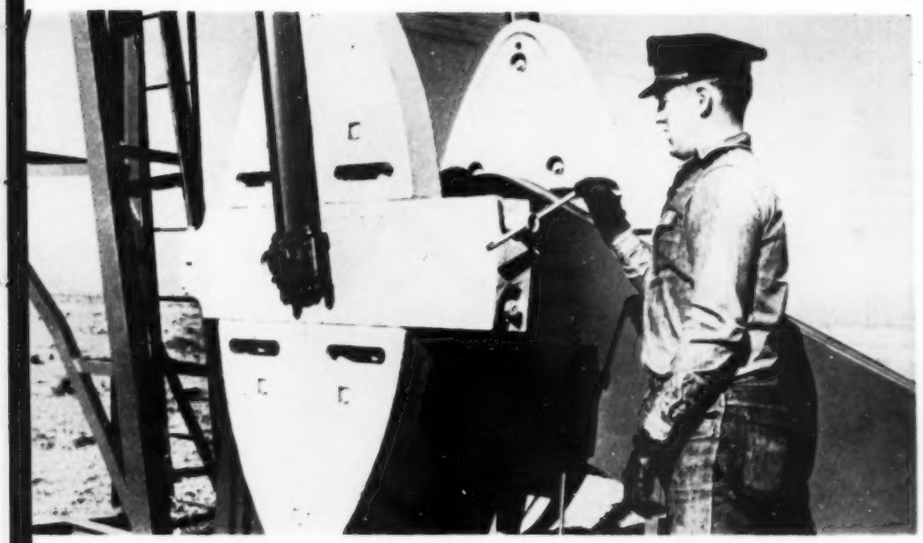
MANY MANUFACTURERS were hard pressed to show their latest equipment at the International Petroleum Exposition in 1948 due to the critical shortage that existed. A large percentage of the equipment shown was sold before it reached the show grounds and almost all the remainder was sold by the time the exposition was over. Due to the critical demand for equipment, few major changes had been made in equipment between the 1948 and the preceding show.

Since 1948, the demand continued until late 1952 on all but a few items. In times of great demand, a seller's market exists, and few manufacturers are eager to make revolutionary changes or improvements if it means an expensive change in shop procedure or delay in procurement of component parts required for assemblies. In anticipation of a leveling off of business, the majority of manufacturers had put a great number of new ideas on the drawing board to be released as time would permit and as competition demanded.

Since late 1952, these new improvements have begun to show up in greater numbers, making it difficult for the prospective purchaser to keep abreast of the trend. At this year's exposition there were revealed a considerable number of new ideas and changes that had not reached the commercial stage until recently.

In sub-surface equipment, alloys have shown their extreme usefulness in tubing sectional liner pumps and insert pumps in improved liners, plungers, balls and seats to meet corrosion problems in particular. Rubber development has been one item that has seen revolutionary changes due to World War II and the Korean War. Improved grades of synthetics are daily reaching the user in many pieces of equipment to prolong their lives and increase their usefulness. In particular, packers, swabs and wipers have enjoyed these better rubbers, as have stuffing boxes.

Plastics have perhaps followed right



Adjustable crank counterbalance, showing ease of adjustment by one man.

along with rubber, as many variations of plastics have been developed in the search for the right rubber for a specific job. Plastic line pipe for flow lines and gathering systems has been used increasingly and with much success in affording corrosion resistance and easier handling due to light weight. There is much promise also in plastic-covered sucker rods which are being used more and more each day. Plastics were used as substitutes for short-supply metals at first, but their continued uses and improvements lead them further along.

Lead and glass as well as plastics have been used more extensively in lining tanks to protect metals from corrosion. The use of lead and glass is not new, but their application and success have seen many advancements.

Great strides have been made in elimination of labor by adapting automatic controls to flow wells into tank batteries where the crude is automatically switched to the next when each tank is filled. At specific times these tanks can be gauged without any manual attention. Likewise, oil can be transferred from receiving tanks to a main battery. At the time the transfer is being made, accurate measurments are taking place. All this is done with electrical controls with very little manual operation or adjustment. Each individual well is opened and shut in automatically and volume of flow can be recorded as desired.

World War II did much to forward development of fuels and lubricants. Higher octane gasolines are available, although few oil field engines are equipped to use such gasolines. Detergents in oils and lubricants have prolonged considerably the life of engine bearings. Most gears are now run in extreme pressure lubricants which prevent rapid breakdown in film. Detergents prevent the breakdown of oils by reducing the formation of carbon or acid which are enemies of bearing surfaces.

The results of tests on aluminum sucker rods have been quite encouraging. For specific corrosive conditions, they have been quite successful. An American Petroleum Institute report in 1952 covered this subject. There is room for more improvement in this respect as factory production methods are not the same with aluminum as with steel rods.

Bottom-hole pumps have become, in a larger percentage, an item of precision, requiring careful alignment and assembly of liners. Balls and seats have seen the addition of many alloys which allow longer life before being cut by sand or rendered useless by corrosive conditions encountered with gas, oil and water. Two zone pumps have been developed which permit the pumping of two strata without mixing crude by by-passing through the annulus between tubing and casing. Rod weight compensators are being tested now and they may prove advantageous in special cases and with further development may become very useful in the reduction of rod loads.

Supersonic pumps, which operate on what amounts to a vibration principle, show that the oil industry also is aware of new principles discovered in this atomic, sonic, and electronic age.

Chemical applications to oil-bearing strata have continued to be numerous and are rewarding experimentation with much improved success. Treatment of crude oil to impede deposition of paraffin and remove impurities before delivery to pipe lines has continued with vigor. This continues to be a broad field with many opportunities, and many displays were visible at the Tulsa show revealing technical details.

Several different methods of fracturing oil bearing "sands" to release the flow of oil have become important, allowing many wells to be placed on a producing basis which previously could not be considered commercial.

Basically, engines and electric motors have not changed. The use of fluid couplings is on the increase to prolong life of equipment by reducing shock load impulses. Improved rubber has increased life of V-belts. Also, V-belts are more closely matched due to new and better precision manufacturing.

Hydraulic pumping units have been developing rapidly and a number were to be seen at the show. Improved packings are promoting their use with less upkeep. With most units, the big obstacle yet to be overcome is cost. At least one low price unit is available and indicates a possible successful development for specific cases.

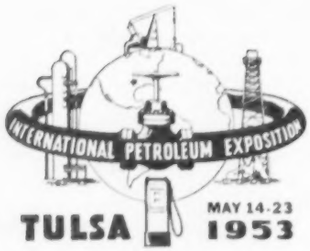
Practically all pumping unit manufacturers using gear reducers have swung over to herringbone gears. Split cases are becoming a thing of the past, but a few still cling on with special sales arguments in their favor. What seems to be a major improvement in pumping units since before World War II is the rubber tail bearing. Only one manufacturer has this feature. Its use eliminates over 60 separate parts and it requires no lubrication or attention whatsoever. In addition, the rubber absorbs much of the shock loads. By dynamometer tests on poorly balanced units as much as 20 percent reduction was noted in peak polish rod load.

Adjustable rotary cranks are not new, but some recent improvements have been made in the methods of adjustments. Most manufacturers now have these cranks with an adjusting screw instead of a ratchet or jack type adjustment. The screw type is a positive adjustment and, from a safety angle, does not allow crank weight to slide off unexpectedly onto the ground —as a few manufacturers have embarrassingly experienced.

Full floor clearance of cranks has almost become a standard in pumping unit design although most manufacturers can still furnish the older style without too much delay.

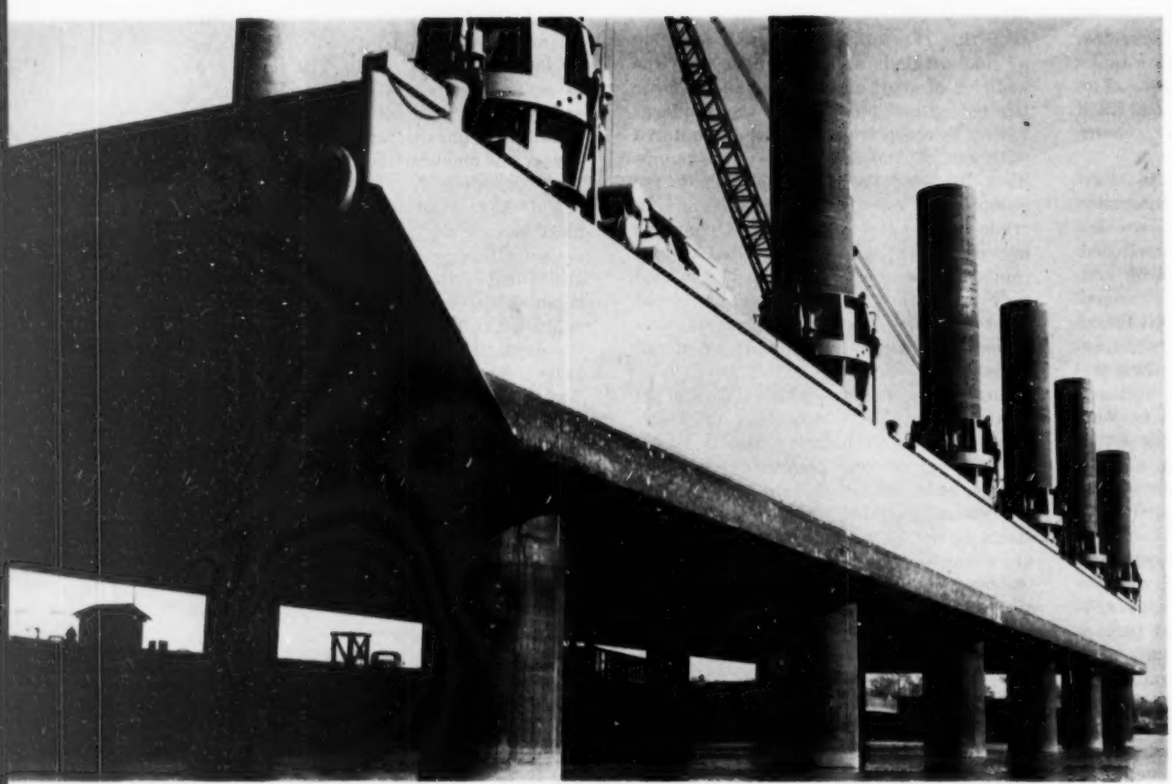
Much has been gained through the API standardization program for pumping units. Few unit designers have not changed their line to meet API specifications. In the immediate past several shops have furnished units stating they were API or better, but the new standards specifically set up to reducer ratings so that an accurate comparison of units can be made. Work is now in progress to have structures follow a specific standardization rating to permit the user the advantage of exact size comparison, as is now possible in reducers.

The foregoing is a brief resume of what was shown at the International Petroleum Exposition. There were also a great number of new items released at the show that had not even found their way to the field except for test cases.



A contrast in shallow and deep-well pumping equipment at the Bethlehem Supply Co. exhibit.

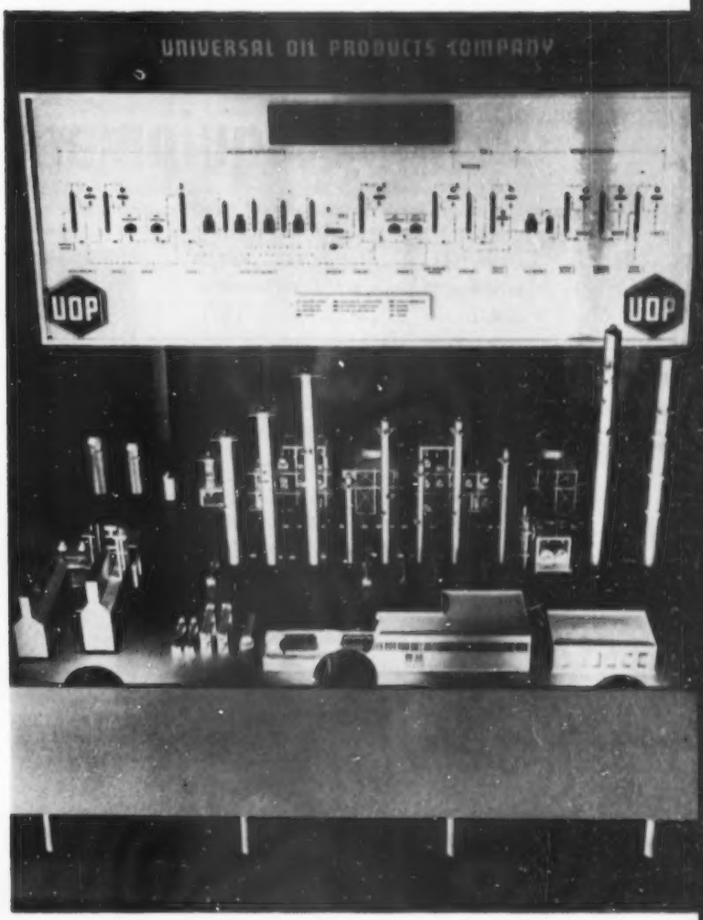
Unit Rig and Equipment Co. drew attention with a 65-foot figure of a driller. The golden man wore a 170½ collar and 70 feet of catline was required to lace his size 100 shoes.



U. S. Steel Corp. displayed a model of this new type of barge developed for over-water drilling. The barge floats to location and drops caissons to the tideland floor which are pile-driven to rock. Jacks then lift the barge above water.

To house small equipment, Bethlehem Supply erected a small-size replica of an oil field store.

Scale model of Cosden Petroleum Corporation's Platformer-Udex combination displayed in the Hall of Science at the Tulsa Exposition. The flow diagram was animated by colored lights to show flow through the unit.



Well logging, perforating and other services of Lane Wells were presented to visitors in this special building. At the left was an exhibit of a new type of boiler capable of developing 200 psi steam from cold water in two minutes.

Industrial television for reporting information from inaccessible points was demonstrated by Continental Supply Co. and at this RCA booth.

INTERNATIONAL PETROLEUM EXPOSITION
TULSA MAY 14-23 1953

Drilling equipment progress

Frederick A. Street has been a member of the sales department of Jones and Laughlin Steel Corp. since 1935, when he started as a storeman at Ada, Okla. After service in Oklahoma and Texas stores he was made manager at Wichita Falls, Texas in 1941. A few months later he entered the military service as a lieutenant in the U. S. Army Ordnance Department. Shortly after his return from the Army, Mr. Street was named export sales representative in New York. Since 1947 he has been city salesman at Tulsa.

By F. A. Street

IN ROUNDING UP the new mechanical devices and practices that have been put to use between the 1948 oil show and the one just finished, it is almost necessary to start at one end of a rig and go through it.

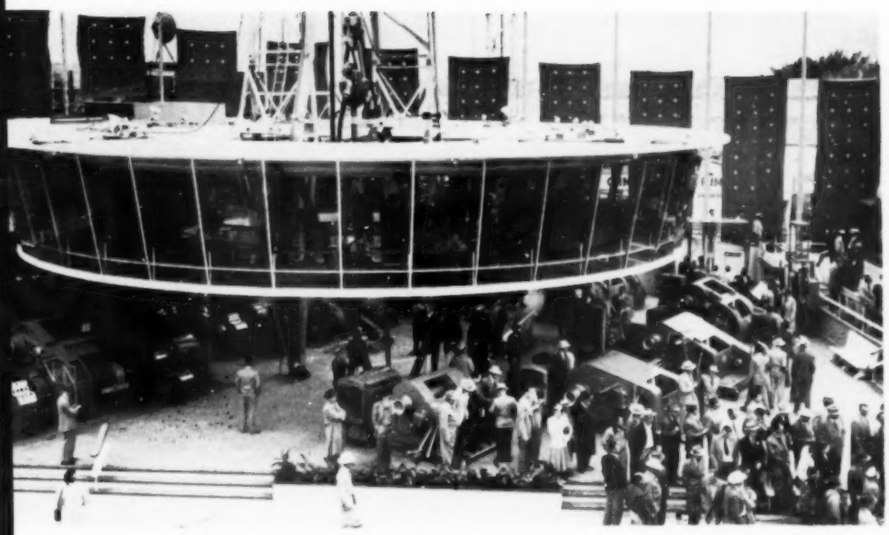
Starting with the power source, we find the trend to internal combustion has continued to the point that approximately 100 percent of the new rigs assembled are power rigs. There has not been a radical change in engines. Compression is somewhat higher and few new sizes have been designed.

Probably the most important development has been the change in power transmission equipment. During the 1948 show, torque converters were on some models; however, they were viewed skeptically by many people. After the 1948 show, hydraulic couplings also were introduced. Today, very few contractors would want a new rig without one of these two types of hydraulic drive. The principal advantages of hydraulic drives are: smoother power, elimination of shock loads and lowering of peaks, lower maintenance costs and better performance. The performance is increased by allowing engines to reach operating speed and delivering near peak torque before load is picked up. Where a transmission is used in conjunction with either of these drives, all shifting can take place and clutches engaged or dis-engaged with engine idling.

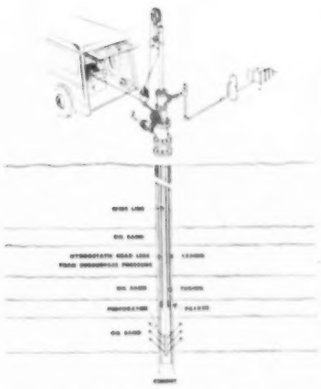
Engine compounds have been unitized and air clutches have been incorporated. High speed roller chains and every wearing part are force-feed lubricated. Sprockets used are heat treated and made to exacting tolerances.

Manufacturers are making more use of alloy steels, magnaflux, heat treating,

A modern all-steel spudder, tandem trailer mounted for fast economical moving. This particular unit can drill 3,500 feet top to bottom. Can be used on clean out work at 7,000 feet.



National Supply Co. built a glass-enclosed "Rotorama" from which visitors could view the drilling rig surmounted by a Lee C. Moore portable mast.



The new expendable shaped charge gun was a major feature of the Schlumberger Well Surveying Corp. exhibit at the oil show. This gun, a new development for perforating casing below the tubing, is designed to pass through tubing. Body of gun is a tubular carrier of soft metal which is shattered by the explosion. The charges are linked in a chain within the carrier with a spacing of five per foot. In practice, maximum shots per trip in the hole is about 150.

stress relieving, etc., in the manufacture of transmissions and drawworks. As a result, today's rig is very little heavier than the rig of a few years ago, but will go to much greater depths faster and with practically no down time for maintenance and repairs.

The 1953 oil show is the first show in history that did not display a single "standard steel derrick." Masts have practically replaced the derrick on all but the barge rigs where it is put up and left. The masts used today leave very little to be desired in strength, portability, ease and speed in lifting, etc.

In looking at the flush pumps we find they are about the same except for the power end. Here we find larger shafts, larger gears (either helical or herringbone), better bearings, and more horsepower input capacity. This has been brought on by the new jet bits introduced in the last two years. The contractors are finding out that higher pressures at the bit nozzles will get the cuttings out of the way and allow the bit to drill much more effectively, thereby making hole faster and with fewer bits.

Drill pipe has not seen any radical changes in design or manufacture. However, drilling contractors have learned a lot about taking care of their pipe. Probably the most important has been the addition of more drill collars, putting the weight directly above the bit and operating the drill pipe in tension. This practice not only gives much greater drill pipe life, but pays a side dividend in helping to keep hole straighter.

The wider use of the various pipe inspection services is paying off in deeper areas. Drilling contractors have discovered this is cheap insurance.

Going below the rig floor we find the

The group of companies making up Dresser Industries combined their exhibits. Between two completely equipped drilling rigs, a modernistic steel building housed smaller displays.

International Harvester showed an extensive line of engines, trucks, tractors, pipe line and earth moving equipment. World-wide service facilities were illustrated with lighted maps.

W. G. Skelly, president of Skelly Oil Co., Tulsa, who has been president of the International Petroleum Exposition since 1925.

William B. Way, exposition manager.

blowout preventer has changed some. Only the owners of small rigs operating in old areas would operate without a blowout preventer of some kind today. For light pressures there are a number of the more inexpensive squeegee types that are quite adequate for the use intended. The higher pressure preventers are the ram type we have known for years, but improved upon. Most of the latter sold are hydraulically operated with two sets of rams that allow the operator to come out of the hole, go back in, drill, etc., with perfect control and safety. One manufacturer has seen the necessity of fabricating a complete manifold to be used with the blowout preventer, thus eliminating the possibility of the 10,000-pound blowout preventer being connected up with lapweld pipe and malleable pipe fittings. These manifolds are fabricated with long sweep ells and seamless pipe and simply fall in place. The simplicity and time saved in rigging up will pay for such manifolds.

A number of manufacturers are trailer-mounting rigs in the 4,000 to 5,000-foot class, and have some very well designed rigs, substructures and masts. This trend probably will continue as far as moving conditions will permit. The desire to increase portability could bring opposite results. A skid-mounted rig broken down into smaller loads can reach any location and is very fast to rig up, so many rigs of the future may be built as multiple units instead of trying to make one load out of a complete rig.

Specialty manufacturers are also continually improving their products. One of the most unnoticed but radical improvements at the 1953 show was the introduction of plastic core wire rope for cable tool drilling and sand lines and spring center wire rope for rotary drilling lines. The plastic core is not affected by chemicals and rot which ruin hemp core, and it gives uniform support. The spring center gives as much support as IWRC, plus additional lubrication space and more flexibility, which is required by the wider use of drilling masts with small sheaves. Flexibility and lubrication being the secret of long life in wire rope, the spring centered wire is a much needed development.

All of the foregoing has been about rotary rigs and related equipment. Contrary to most popular opinion, the cable tool boys are still at it, too. However, Col. Drake, in his wildest dream, never saw anything like a modern spudder. The same changes have taken place on this type of rig that are found on rotary rigs, with the exception of hydraulic couplings. The hydraulic couplings are too "soft" and cut down on the spudding action. However, there are a few spudders with torque converters that owners have added and the reports are extremely favorable. I do not know of any cable tool drilling rig made today with a torque converter designed in the rig by the manufacturer. The other changes we find are the change to steel beams from wood, change from babbit and bronze bearings to roller and ball bearings, larger shafts, V-belt and roller chain drives, better designed "A" frames and pole type masts, plus the mounting on tandem wheeled highway trailers. They have even put tin hats on the tool dresser. Yes sir, the cable tools are still with us and are just as modern as the more expensive, bigger, younger rotary rigs. They can still do some things the rotary rigs cannot do—yet.

There have been constant evolutionary changes in almost every part of the drilling industry. The manufacturers of oil field equipment are doing a wonderful job on research for the industry. The average contractor does not realize the tremendous amount of money that the manufacturer spends for research. The manufacturer is never satisfied with yesterday's successes, but always tries to make the perfect product so that his company can reap more sales. This never-ending research and constant improvement can take place only in a country in which free enterprise is allowed to operate.

U.S. imports discussion creates Venezuelan "petroleum crisis"

THE "petroleum crisis," as it was called in Caracas newspapers, received more attention in the Venezuelan press than any question concerning the industry has ever received before as the time approached for Congressional hearings on the various proposals to reduce oil imports. Eugene Holman's statement that Standard Oil Co. (N.J.) would reduce imports by 18,000 b/d, mostly Venezuelan crudes, was a front-page story which ignored the fact that this would be only about one percent of Venezuela's production. Much space was also given to calculating Venezuela's loss in income in the event that the Simpson proposal were adopted, at amounts ranging from $150 million to $342 million per year.

All in all, the lively interest that has been aroused is probably healthy. The industry, and Venezuela's position as a producer and exporter, is usually taken completely for granted, and elementary facts about the world market and the possibility of losing out in the competition for a share are beyond the ken of the average newspaper reader or writer. The floods of ink that have been spilled in the last few weeks will probably have a little residuary educational value. As it happens, Creole Petroleum Corp. has just been giving a special course of lectures by members of the staff for newspaper and magazine writers, and this has probably contributed something toward a better public understanding of the industry and its problems.

Since President Eisenhower's request that the reciprocal trade treaty be kept intact for a while longer, there has been a noticeable decline in the amount of newspaper space given to oil matters. However, the Economic Committee to Defend the Oil has resolved to turn itself into a permanent commission. Its president, Sr. Feliciano Pacanins, has declared that the danger has by no means disappeared, that optimism is unwarranted, and that the present one-sided Venezuelan economy must be diversified so as to lessen the country's dependence on oil. The necessity of "sowing the oil," in the phrase coined by a Venezuelan president in the 30's, has been echoed over and over again lately.

There is talk of the Ministry's inviting European capitalists to consider entering Venezuela to produce oil, to be refined domestically or abroad, in order to widen the market. The possibility of offering special concessions for the purpose has been mentioned in print.

The Argentine Ambassador returned from a vacation at home with the announcement that his government is disposed to make an offer for part or all of any Venezuelan oil which may become surplus if the United States adopts a policy of limiting imports. They would deal with the Venezuelan government to lift its royalty oil (one barrel out of every six) which is normally bought by the producers without its passing out of their control, but which the government may at any time elect to take in kind. Minister of Mines and Hydrocarbons Edmundo Luongo C. told reporters his government would welcome negotiations with Argentina or any other country disposed to buy.

Daily average production by months so far this year has been: January, 1,792,060 barrels; February, 1,717,054; and March, 1,718,505. The first-quarter average is thus 1,743,390 b/d, or about seven percent under 1952's figure for the year of 1,803,910 b/d. Production has been gaining in recent weeks, and it seems likely that the average for April will run about 1,750,000 barrels per day.

For the purposes of the public budget, the government is calculating its revenue from oil for the fiscal year 1953-54 on the assumption of an average daily production of 1,700,000 barrels for the period, as against the 1,800,000 b/d figure used for the last budget.

The total of rigs operating in April was 111 (excluding those on workovers), three less than in March and five less than in January. Mene Grande was running 33, Shell 29, Creole 19 and the other eight companies from one to nine each. The Texas-Las Mercedes combine is operating seven rigs in the Mercedes area of Guarico in an intensive effort to evaluate that acreage completely, and will increase the rigs in the Mata area northeast of Greater Oficina from three to five soon. The 111 rigs were divided 47 in Western Venezuela, 64 in Eastern fields, with 75 on development drilling and the remaining 36 on exploration.

The Texas Co. will send two drilling rigs and other heavy machinery to Peru to work the concessions newly acquired there, plus more than thirty Venezuelan workers.

Shell's Pueblo Viejo deep test LS-1387 has now been bottomed at 17,537 feet, and Creole's Alturitas-2 has reached a final depth of 17,265 feet. Both are deeper than the deepest previous hole outside the United States, Alturitas-1, which went to 17,039 feet in 1950, and both are among the world's ten deepest holes. The world's deepest producing well, a Shell hole completed at 17,183 feet in the Weeks Island field of Louisiana, was drilled in 141 days; LS-1387 took two years and a month.

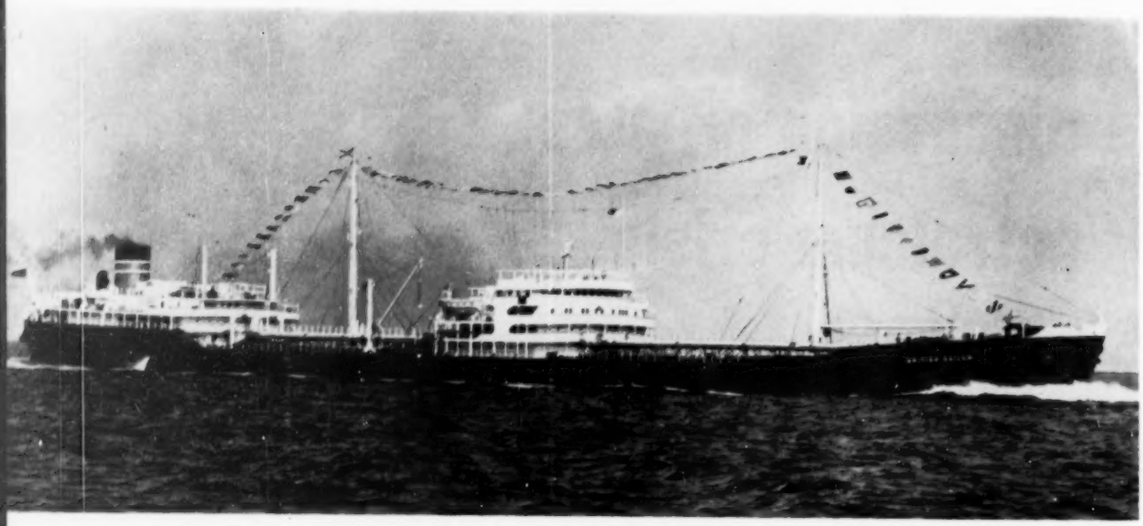
Creole has spudded Hervidero-1 near the mud volcanoes of northern Monagas. East Pilon-1, the first of two scheduled wildcats east of the heavy-oil field of the same name, was drilled to just below 4,000 feet and abandoned without running casing. In the Cumarebo field of Falcon, Creole recently completed CU-144 as a new-pool find at 5,500 feet.

Atlantic has moved a rig back into the Rositas area west of Ruiz field in Guarico. One well was completed there, then the rig was moved out to do some wildcatting before the rainy season made movement impossible. Atlantic has been drilling a series of slim holes near the Taman wells without success. Las Ollas-2 is now testing at final depth of 8,500 feet, and a new-field test Guarico 9-1 is drilling below 6,200 feet.

The Texas Co. has bottomed Tiguaje-1 at about 4,500 feet in Falcon, between Hombre Pintado field and the town of Dabajuro, and testing is about to begin.

Sinclair's wildcat in the Barinas basin, Sinco-1, has reached final depth of about 9,500 feet. Presumably testing operations are being carried on, but the secrecy surrounding this hole is complete. Sinclair is also drilling Santa Barbara SB-147 at around 6,000 feet, and Roblote-2 is still testing.

Shell is deepening several La Paz field wells completed in the Cretaceous limestone a few years ago, and is having some success in increasing their production.



The 32,000-ton British Sailor during her recent trials off the Isle of Arran. She is the first of 13 oil tankers of the 32,000-ton class being built in British shipyards for the British Tanker Company.

World tanker fleet shows rapid growth

By E. Lawson Lomax

THE PAST YEAR has seen a further increase in the number and total tonnage of tankers launched. In 1951, 145 tankers with a total gross tonnage of 1,537,760 were launched, while in 1952 these figures have risen to 176 ships of a total gross tonnage of 2,002,160.

There is also an increase in the average weight of the vessels launched, from 10,600 to 11,430 gross tons, thus showing the general tendency for increase in size of these ships.

In 1951 there were 18 steam driven and 127 motor driven tankers launched, and in 1952 the numbers were 57 steam and 119 motor driven. This change in proportions is due to the large number of big ships with turbine or turbo-electric propulsion, although in Great Britain and on the Continent there are 27 diesel propelled vessels of over 20,000 dwt being built or on order, the largest being in Norway, where among the 10 of over 20,000 dwt, there are seven of 32,000 dwt each.

Total world production of crude oil has increased by just over five percent during the last year, but production from the Middle East fields has increased by over eight percent, i.e., about 156,500 barrels per day. As the major portion of crude produced in the Middle East has to be transported by tanker to refining centers, it will be seen that this means an increased demand for tanker tonnage, the increase during the year meaning about 350 tanker voyages of 22,000 tons each.

It is questionable, however, in the case of the existing world fleet, whether an average of 22,000 tons per voyage for the tankers engaged on this work could be maintained, and probably an average of 18,000 tons would be nearer the mark. In this case, about 400 voyages would be required for handling this increase in Middle East production alone, which at an average of six round voyages a year per tanker would require the addition of 66 vessels to the world tanker fleet.

The world tanker fleet of 1,000 tons gross and over totalled 2,379 vessels with a total gross tonnage of 19,675,712 at the end of July 1952, of which about 17 percent is over 20 years old and probably would be due for scrapping if vessels were available for replacement. This 17 percent is equivalent to 406 vessels with a gross tonnage of over 3.3 million, which is 165 percent of the total tonnage launched in the world's shipyards during 1952.

Increased production in the Middle East required an increase of 66 vessels of 18,000 dwt to deal with that transport. There were also increases in production in Venezuela, Mexico and Indonesia which call for further shipping capacity, thus bringing the amount of increased production during the year equivalent to a total of about 100 tankers, leaving 76 ships for replacement purposes, against a total of 406 ships of over 20 years of age. There is thus a margin of 863,700 gross tons for replacement against 3.3 million gross tons for replacement at the optimum rate of the vessels over 20 years of age.

One of the factors which will affect this position in the future is the size and spread of some of the tankers now on order or under construction. Out of a world total of 730 tankships on order or building at the end of 1952, 244 were vessels of over 20,000 dwt each, the largest of them being two vessels of 45,400 dwt on order in the United States, two of 44,000 dwt on order at a British yard, and three of 40,000 dwt on order in a German yard.

Most of these large tankers of above 20,000 dwt capacity are also built for a higher speed than normal, this speed ranging from 15-17 knots, and therefore the average yearly number of round trips will be greater, materially assisting in the ability to scrap a larger amount of tonnage yearly. But in spite of this, it would appear that present tanker building capacity in the world's shipyards is not keeping abreast of actual requirements, and that for some years yet this capacity under normal circumstances will be fully occupied.

It is an apparent anomaly that at the

Tanker World Concord ($1,000 dwt) constructed at the Barrow-in-Furness shipyard of Vickers-Armstrongs Ltd. for the World Tanker Corp. of Liberia.

time of writing, the chartering market for tankers is somewhat dull and that charterers are looking for and obtaining lower charter rates, while a few tankers are available for chartering.

This, however, is probably only a seasonal occurrence and is not indicative of the whole trade. In any case, the percentage of tankers looking for freight is so small as to be almost negligible.

While the number of launchings rose in 1952 to 176 as against 145 in 1951, the number of tankers on order or building rose from 515 with a dead weight tonnage of 10,577,000 at the end of 1951 to a total of 730 with a dead weight tonnage of 15,055,515, showing that shipowners still view the future prospects for this class of shipping with a certain amount of optimism, and that this optimism is shared both by the oil companies and the independent owners.

At the end of 1951, out of the 535 tankers on order, 114 were to the account of oil companies and 421 to the account of independent shipping firms, while at the end of 1952 the figures were respectively 201 and 529.

The following table shows the variation in the methods of propulsion of the tankers on order at the end of 1951 and 1952:

	No.	1951 dwt	No.	1952 dwt
Diesel	350	6,190,600	385	6,716,290
Turbine	177	4,238,400	326	8,152,955
Turbo-electric	6	107,600	5	99,400
Steam (Reciprocating)	2	20,600	14	86,870
	535	10,557,200	730	15,055,515

It will be seen that there has been a large increase in the number and dwt of turbine propelled vessels as against that of diesel propelled vessels, showing the tendency toward the use of turbine propulsion for the larger vessels.

During the year, orders have been placed in the United States for two tankers of 45,000 dwt, and there has been talk of even larger tankers of 50,000 dwt being considered.

There is no great difficulty regarding the construction of tankers of this size, nor in the manufacture of turbines for their propulsion, but one point which arises out of this is the size of propeller which will be required for these single screw vessels.

The propeller for one of the 32,000 dwt turbines launched in a British yard weighed 27.5 tons, but for the larger size tankers of 44,000 dwt this weight will be much greater.

No doubt the fitting of a propeller of such a weight would not present undue difficulties at the shipyard where the tanker was built, but it might present very great difficulties at repair yards or dry docks, when the tanker was due for overhaul or possibly had to be sent there in case of accident. Very powerful lifting gear would be required, and any failure of this or accident in handling would have disastrous consequences.

During the past year, two very interesting tankers have been ordered by the Shell organization. One of these is specially fitted with safety devices for the control of petroleum vapors arising from the cargo, with consequent reduction of fire hazard. Cargo tanks are specially sealed, galleys and engine rooms, and any other room where fire could possibly originate, are pressurized against the entry of petroleum vapors, and in addition to other safety precautions, a new form of safety gangway is to be fitted.

The other tanker ordered by the same organization is to be powered solely by gas turbines. The decision to build this tanker with this new form of propulsion arose out of the successful trials of a gas-turbine unit, using Bunker C fuel, which was installed on the "Auris" and has been running satisfactorily for some time.

Another tanker which has been launched at the Birkenhead Yard of Messrs. Cammell Laird is the "Esso Oxford," built to the order of the Esso Petroleum Co. Ltd. This tanker was designed in the United States, and is of great interest firstly owing to the boiler pressures used (850 psig at 850°F), and also owing to the high rates of loading and discharge for which she was designed—5,000 tons per hour loading and 3,000 tons per hour discharge by the ship's pumps.

At the Coronation Naval Review to be held at Spithead on June 15, three modern tankers have been allotted stations as representatives of the petroleum industry. The tankers on station will be the S.T.S. Velletia, 28,000 dwt, of the Shell organization; the S.T.S. British Sailor, 32,000 dwt, of the British Tanker Co. (subsidiary of the Anglo-Iranian Oil Co.), the largest tanker launched in the world to date; and the M.V. Caltex Bahrain, of Overseas Tankship (U.K.) Ltd., associate of the Caltex group of companies.

TONNAGE OF BUILDING TANKERS

World Building	No.	Tons Gross	dwt	Total Equivalent in dwt
Diesel	385	1,001,330	5,243,790	6,716,290
Turbine	326	530,890	7,372,235	8,152,955
Turbo-Electric	5	———	99,400	99,400
Steam	14	21,700	50,550	86,870
	730	1,556,920	12,765,975	15,055,515
Diesel Average dwt				17,450
Turbine Average dwt				25,000

ANALYSIS OF TANKERS UNDER CONSTRUCTION IN SHIPYARDS OF THE WORLD DECEMBER 31, 1952

SHIPYARDS	NO. OF TANKERS BUILDING	DEAD WEIGHT TONS (Or Gross)	DIE-SEL	TUR-BINE	RE-CIPRO-CATING	NO.	BRITISH OWNERS D.W.T. (Or Gross)	NO.	FOREIGN OWNED D.W.T. (Or Gross)	NO.	OIL CO. D.W.T. (Or Gross)	NO.	INDEPEN-DENTS D.W.T. (Or Gross)
GREAT BRITAIN													
Barclay Curle & Co. Ltd.	3	51,000	3	—	—	—	—	3	51,000	—	—	3	51,000
Bartram & Sons, South Dock, Sunderland	1	16,000	1	—	—	—	—	1	16,000	—	—	1	16,000
Blythe Dry Docks & Ship-building Co.	6	75,000	4	—	2	4	39,000	2	36,000	4	39,000	2	36,000
Blythswood Shipbuilding Co. Ltd., Scotstoun	11	116,900(G)	7	2	2	6	59,150(G)	5	57,750(G)	4	43,300(G)	7	73,600(G)
Geo. Brown & Co. (Marine) Ltd., Greenock	1	4,000	—	—	1	—	—	1	4,000	—	—	1	4,000
John Brown & Co. Ltd., Clydebank	10	296,000	—	10	—	5	154,500	5	141,500	5	154,500	5	141,500
Caledon Shipbuilding & Engineering Co. Ltd., Dundee	3	34,660(G)	3	—	—	2	21,160(G)	1	13,500(G)	—	—	3	34,660(G)
Cammell, Laird & Co. Ltd., Birkenhead	19	409,900	2	17	—	19	409,900	—	—	19	409,900	—	—
Chas. Connell & Co. Ltd., Scotstoun	6	108,500	6	—	—	2	36,500	4	72,000	—	—	6	108,500
John Crown & Sons Ltd., Sunderland	1	18,250	1	—	—	—	—	1	18,250	—	—	1	18,250
Wm. Doxford & Sons Ltd., Sunderland	4	68,200(G)	6	—	—	4	45,400(G)	2	22,800(G)	2	22,600(G)	4	45,400(G)
Fairfield Shipbuilding & Engr. Co. Ltd., Govan	5	89,000	3	2	—	1	16,000	4	73,000	1	16,000	4	73,000
Furness Shipbuilding Co. Ltd., Haverton Hill	39	886,650	18	21	—	29	654,200	10	232,450	2	33,000	37	853,650
Wm. Gray & Co., West Hartlepool	1	3,150	—	—	1	1	3,150	—	—	—	—	1	3,150
Greenock Dockyard Co. Ltd., Greenock	4	60,800	4	—	—	4	60,800	—	—	—	—	4	60,800
Wm. Hamilton & Co. Ltd., Port Glasgow	10	127,000dwt 23,400(G)	10	—	—	3	16,000dwt 23,400(G)	7	111,000	1	16,000	2 7	23,400(G) 111,000
Harland & Wolff Ltd., Belfast	17	348,900	8	9	—	9	214,000	8	134,900	9	214,000	8	134,900
Harland & Wolff Ltd., Govan	9	155,000	8	1	—	5	80,500	4	74,500	2	29,000	7	127,000
R. & W. Hawthorn, Leslie & Co. Ltd., Hebburn	19	391,600	4	15	—	19	391,600	—	—	16	335,000	3	56,000
Sir James Laing & Sons Ltd., Sunderland	10	181,900	10	—	—	6	102,500	4	79,400	2	32,000	8	149,900
Lithgows Ltd., Port Glasgow	17	296,300	12	5	—	11	192,500	6	103,800	7	122,000	10	174,300
Scotts Shipbuilding & Engr. Co. Ltd., Greenock	8	131,260	8	—	—	5	80,260	3	51,000	3	50,000	5	81,260
Smiths Dock Co. Ltd., South Bank, Wallsend	17	257,100	5	9	3	10	211,000	7	46,100	10	178,000	7	79,100
Swan Hunter & Wigham Richardson Ltd., Newcastle-on-Tyne	12	254,600	5	5 2*	—	9	190,000	3	64,600	8	171,400	4	83,200
Swan Hunter & Wigham Richardson Ltd., Newcastle-on-Tyne	6	102,100	6	—	—	3	48,000	3	54,100	2	32,000	4	70,000
J. L. Thompson & Sons Ltd., Sunderland	13	228,850	11	2	—	9	162,850	4	66,000	5	84,000	8	144,850
John I. Thornycroft & Co. Ltd., Southampton	1	6,000	1	—	—	—	—	1	6,000	—	—	1	6,000
Vickers-Armstrong Ltd., Barrow	11	323,200	1	10	—	11	323,200	—	—	9	235,200	2	88,000
Vickers-Armstrong Ltd., Walker	11	193,220(G)	2	9	—	4	75,200(G)	7	123,020(G)	2	35,300(G)	9	162,920(G)
TOTAL	277	4,822,060dwt 441,380(G)	149	117 2* turbo-elec.	9	181	3,386,460dwt 224,310(G)	96	1,435,600dwt 217,070(G)	113	2,150,000dwt 101,200(G)	164	2,672,060dwt 340,180(G)
CANADA													
The Collingwood Shipyards Ltd., Ontario	1	15,800	—	1	—	1	15,800	—	—	1	15,800	—	—
Davie Shipbuilding & Repairing Co. Ltd., Lauzon, Levis, Quebec	2	56,000	—	2	—	—	—	2	56,000	—*	—	2	56,000
TOTAL	3	71,800	—	3	—	1	15,800	2	56,000	1	15,800	2	56,000
BELGIUM													
Jos. Boel & Fils, S. A. Tamise	3	39,000(G)	3	—	—	—	—	3	39,000(G)	—	—	3	39,000(G)
Soc. Anon. John Cockerill, Hoboken	12	246,900	4	8	—	—	—	12	246,900	5	112,400	7	134,500
TOTAL	15	246,900dwt 39,000(G)	7	8	—	—	—	15	246,900dwt 39,000(G)	5	112,400	10	134,500dwt 39,000(G)
DENMARK													
Burmeister and Wain, Copenhagen	6	80,550	6	—	—	—	—	6	80,550	2	17,800	4	62,750
A/S. Nakskov Skibsvaerft, Nakskov	1	10,000(G)	1	—	—	—	—	1	10,000(G)	—	—	1	10,000(G)
Odense Staalskibsvaerft A/S. Odense	9	106,600(G)	9	—	—	—	—	9	106,600(G)	—	—	9	106,600(G)
TOTAL	16	80,550dwt 116,600(G)	16	—	—	—	—	16	80,550dwt 116,600(G)	2	17,800	14	62,750dwt 116,600(G)
FRANCE													
Chantiers Navals De La Ciotat, La Ciotat (B.D.R.)	6	126,500dwt 12,000(G)	3	3	—	—	—	6	126,500dwt 12,000(G)	6	126,500dwt 12,000(G)	—	—
Soc. Anon. Des Anciens Chantiers Dubigeon	1	2,650	1	—	—	—	—	1	2,650	—	—	1	2,650
Ateliers & Chantiers De France, Dunkerque	5	154,400	—	4 1*	—	—	—	5	154,400	—	—	5	154,400
Ateliers & Chantiers De La Loire, Paris, St. Nazaire Yard	2	57,750	1	1	—	—	—	2	57,750	1	36,250	1	21,500
Ateliers Et Chantiers De La Seine Maritime, Le Trait	5	94,500	2	3	—	—	—	5	94,500	—	—	5	94,500
Chantier De St. Nazaire Penhoet, St. Nazaire	12	355,000	2	10	—	—	—	12	355,000	5	151,000	7	204,000
TOTAL	31	790,800dwt 12,000(G)	9	21 1* turbo-elec.	—	—	—	31	790,800dwt 12,000(G)	12	313,750dwt 12,000(G)	19	477,050
GERMANY													
Bremer Vulkan Schiffbau & Maschinenfabrik	7	81,740(G)	5	—	2	—	—	7	81,740(G)	2	20,000(G)	5	61,740(G)
Deutsche Werft, Hamburg	26	509,430	14	12	—	2	30,400	24	479,030	9	186,900	17	322,530
Howaldtswerke A. G., Hamburg	5	181,500	—	5	—	—	—	5	181,500	—	—	5	181,500
Howaldtswerke A.G. Werk Kiel, Kiel	22	579,900			—	—	—	22	579,900	—	—	22	579,900
Nordseewerke Emden G.m.b.h., Emden	5	55,000(G)	1 5	21	—	1	11,000(G)	4	44,000(G)	—	—	5	55,000(G)
A. G. Weser, Bremen	10	203,100	—	10	—	—	—	10	203,100	—	—	10	203,100
A. G. "Weser" Werk Seebeck, Bremerhaven	2	11,000	1	—	1	—	—	2	11,000	—	—	2	11,000
TOTAL	77	1,484,930dwt 136,740(G)	26	48	3	3	30,400dwt 11,000(G)	74	1,454,530dwt 125,740(G)	11	186,900dwt 20,000(G)	66	1,298,030dwt 116,740(G)

(Please turn to page 74)

The S.S. North Dakota, latest addition to The Texas Co. fleet, being towed to the fitting-out basin at Newport News. The new vessel has a cargo capacity of 152,000 barrels. Photo courtesy The Texaco Star.

Checking radio equipment on the Delaware Sun.

U.S. tanker fleet growth slower than other nations

ALTHOUGH AMERICA'S tanker fleet is still the world's largest, its relative position among world tanker fleets is declining. Following present trends, the United States will yield its lead position in this respect to Great Britain by 1957.

Immediately after World War II, the United States had 60 percent of the world's tanker carrying capacity. Today it has 29.4 percent and by 1957 it is not expected to have more than 22 percent of the world's total. Flag registry does not tell the entire story, since United States owners have registered a considerable number of tankers under foreign flags. Even considering "controlled" tonnage, the American percentage of tankers is dropping.

The gradual decline in America's dominant position in ocean-going tanker carrying capacity is traced in the recent eleventh annual analysis of world tanker fleets by the statistical research division of Sun Oil Co. The previous studies were prepared under the supervision of the late Benedict Saurino, a recognized authority on world tanker fleet statistics, who died last year.

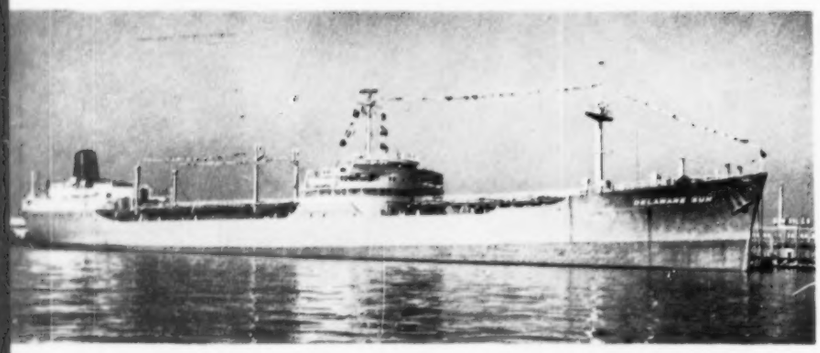
On October 1, 1952 the world fleet of ocean-going tank ships (2,000 gross tons and greater) totalled 2,292 vessels. This represents an increase of 381 ships since the immediate postwar date of September 1, 1945 and a gain of 161 since April 1, 1951. Numbers, however, are a poor yardstick for measuring a fleet of vessels, the Sun report points out. Not only has the average size of tank ships grown materially through the years, but also the speed at which they cruise.

The average deadweight of the world fleet was nearly 13,700 tons last October. Comparisons with earlier periods show an average capacity of about 13,250 tons in April 1951 and 12,500 tons immediately postwar. Thus, in a period of only slightly more than seven years, average tanker size has increased nearly 10 percent.

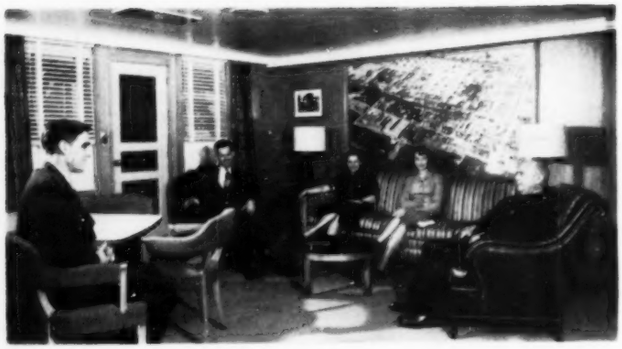
In average speed a similar steady rise has been in evidence. When weighted by deadweight tonnage, the world fleet of September 1945 averaged 12.8 knots. By April 1951 this average had risen to 13.3 knots and still further to 13.4 knots in October 1952. Again, in this period of approximately seven years, there has occurred a rise of about 4½ percent in the speed of the average tanker.

In October 1952, nearly 30 percent of the carrying capacity of the world fleet was found in the 14 to 15-knot speed group and the 16,000 to 17,000 dwt group, in which category falls the T2-SE-A1. Also on this date, there were in service 149 tankers which were both faster and larger than the T-2, this group being the equivalent of 232.1 T-2's, or 13.4 percent of the world total. The growth trend is emphasized by the change that has taken place since January 1, 1949, at which time there were only 60 of these large, fast vessels, aggregating the equivalent of 79.2 T-2's or 6.2 percent of the then world fleet. Thus, in this 45-month period, while the carrying capacity of the world increased only slightly more than one-third, the portion of the world fleet represented by these large ships more than doubled, and their equivalent in terms of T-2's nearly trebled.

Significant differences are noted in the speed comparison of the world fleet by flags. All United States tankers averaged 14.6 knots on October 1. Private vessels averaged 14.2 knots. This, however, was the fastest average speed among the major flags, with Panama, Norway and



The Delaware Sun, new queen of the Sun Oil Co. fleet, as delivered by Sun Shipbuilding and Dry Dock Co.



Captain's day room on the Delaware Sun.

the British Empire following in that order with average speeds of 13.6, 13.2 and 12.5 knots.

Among the four major tanker owning countries, the October 1, 1952 fleet of the U.S. ranked first in average size, 15,360 dwt. Panamanian vessels, with an average of 15,190 tons, were second, followed by Norway and the British Empire at 14,850 and 12,520 tons, respectively. Since the close of the war, the U.S. fleet has shown a smaller average gain in size per vessel than other leading nations.

In no other facet of fleet characteristics will tanker owners and builders be confronted by a more perplexing problem than is revealed by an age analysis. Assuming a 20-year life for tankers, the most desirable age distribution would be one in which approximately five percent of carrying capacity needs replacement each year. As a result of wartime building, wide discrepancies exist between the actual age distribution and any reasonably well balanced pattern. Presently, there exist 672 T-2 equivalents constructed in 1943, 1944, and 1945, an excess of approximately 414 T-2 equivalents over normal replacement in these three years. Perspective on the magnitude of the problem is afforded by the realization that 414 T-2 equivalents are nearly one-fourth of the present world total.

In the 18-month period ended October 1, the average age of the world fleet increased four months. Changes in the major fleets were +15 months for the United States, —1 month for the British Empire, —15 months for Norway and +21 months for Panama. Overall, just under one-third of the October 1 world fleet was constructed in 1946 or subsequent years. Norway has built 60.5 percent of its carrying capacity since the war. The British Empire and Panama both had slightly more than one-third of their fleets in this newer age grouping, while the United States had only about 6.5 percent.

Individual owners of five or more tankers numbered 14 in the oil group and 10 in the non-oil. Of these, the largest in terms of parent organizations was Standard Oil Co. (N.J.), with 57.4 T-2's

TABLE I

PROBABLE 1957 WORLD TANKER FLEET

Flag	10-1-52 Fleet	Construction Program	12-31-57 Fleet No Scrappage	12-31-57 Fleet Full Scrappage	Percent Change 10-1-52 to 12-31-57 No Scrappage	Percent Change 10-1-52 to 12-31-57 Full Scrappage
United States	508.3	51.3	559.6	530.4	+10.1%	+ 4.3%
British Empire	340.5	263.3	603.8	540.8	+77.3	+38.8
Norway	258.3	214.5	472.8	423.7	+83.0	+64.0
Panama	165.3	131.5	296.8	264.8	+79.6	+60.2
Total World	1,726.8	972.8	2,699.6	2,409.4	+56.3	+39.5

TABLE II

WORLD TANK SHIP FLEET, ACTUAL AND T2-SE-A1 EQUIVALENTS AS OF OCTOBER 1, 1952

Ocean-Going Vessels 2,000 Gross Tons and Over

Flag	Actual No.	Actual dwt	Actual Average Speed	T2-SE-A1 Equivalents No.	T2-SE-A1 Equivalents dwt	As % of World
WESTERN HEMISPHERE						
United States	550	8,446,400	14.6K	508.3	8,521,600	29.4%
Government	122	1,695,400	16.2	113.0	1,894,400	6.5
U.S.M.A.	4	46,700	10.5	2.0	33,500	0.1
Military	118	1,648,700	16.4	111.0	1,860,900	6.4
Private	428	6,751,000	14.2	395.3	6,627,200	22.9
Oil Companies	288	4,624,900	14.3	272.2	4,563,400	15.8
Non-Oil Companies	140	2,126,100	14.1	123.1	2,063,800	7.1
Panama	194	2,946,000	13.6	165.3	2,771,300	9.6
U.S. Citizen	119	2,031,900	14.5	121.3	2,033,600	7.0
Canada	15	201,000	14.2	11.8	197,900	0.7
Others:						
Argentina	38	441,500	13.2	24.0	402,400	1.4
Brazil	9	133,800	14.0	7.7	129,100	0.4
Costa Rica	1	10,300	10.0	0.4	6,700	0.0
Honduras	12	229,500	14.2	13.4	224,600	0.8
Mexico	20	186,900	10.7	8.3	139,100	0.5
Peru	1	4,300	10.0	0.2	3,400	0.0
Uruguay	2	33,200	14.5	2.0	33,500	0.1
Venezuela	35	152,600	9.5	6.0	100,600	0.4
Sub-Total Others	118	1,192,100	12.6	62.0	1,039,400	3.6
TOTAL WESTERN HEMISPHERE	877	12,785,500	14.2	747.4	12,530,200	43.3
EUROPE						
E.C.A. Countries	1,249	16,250,400	12.6	853.0	14,300,500	49.4
Belgium	8	100,500	12.3	5.1	85,500	0.3
Denmark	31	460,200	13.3	25.1	420,800	1.4
France	89	1,257,100	13.0	67.4	1,129,900	3.9
Germany	14	161,900	10.3	6.9	115,700	0.4
Greece	13	166,200	13.3	9.1	152,500	0.5
Italy	92	1,119,300	12.6	58.0	972,400	3.4
Netherlands	108	879,900	11.9	43.2	724,200	2.5
Norway	321	4,767,100	13.2	258.3	4,330,400	14.9
Portugal	6	94,100	13.7	4.7	78,800	0.3
Sweden	55	617,600	13.7	46.1	772,900	2.7
Switzerland	2	22,400	10.6	1.0	16,800	0.1
Turkey	3	34,700	12.7	1.8	30,200	0.1
United Kingdom	507	6,379,400	12.4	326.3	5,470,400	18.9
Others:						
Finland	7	78,500	10.3	3.3	55,300	0.2
Poland	2	21,300	10.9	0.9	15,100	0.0
Spain	24	203,200	11.5	9.6	161,000	0.6
U.S.S.R.	19	183,800	11.1	8.4	140,800	0.5
Yugoslavia	2	21,700	11.5	1.0	16,800	0.1
Sub-Total Others	54	508,500	11.1	23.2	389,000	1.4
TOTAL EUROPE	1,303	16,758,900	12.7	876.2	14,689,500	50.8
China	4	40,400	10.2	1.7	28,500	0.1
India	1	5,400	8.0	0.2	3,400	0.0
Indonesia	1	3,800	10.0	0.2	3,300	0.0
Japan	44	597,200	13.3	32.7	548,200	1.9
Liberia	56	1,087,600	14.8	66.2	1,109,800	3.8
New Zealand	1	4,500	11.0	0.2	3,300	0.0
Pakistan	2	15,000	9.7	0.6	10,100	0.0
Misc. Brit. Colonies	3	20,000	16.7	1.4	23,500	0.1
TOTAL WORLD	2,292	31,318,300	13.4	1,726.8	28,949,800	100.0
TOTAL BRITISH EMPIRE	529	6,625,300	12.5	340.5	5,709,600	19.7
TOTAL UNITED STATES CONTROL ALL FLAGS	839	12,652,600	14.4	761.0	12,758,200	44.1

amounting to 14.5 percent of the private fleet, 11.3 percent of the total U.S. fleet, and 3.3 percent of the world. The second largest owner was Gulf Oil Corp. with 8.4 percent of the private fleet. Third in rank, and first among the non-oil group, was National Bulk Carriers Inc., with about six percent of the private United States carrying capacity. Among the 24 owners of five or more tankers, average fleet speeds were grouped rather closely around the overall mean of 14.2 knots, although the range of the averages was between 12.8 and 15.6 knots.

In average age, considerably more diversification is noticeable, with the youngest company fleet being 7½ years old and the oldest 14½ years. Oil company owned vessels were on the average slightly faster and older than those owned by non-oil interests.

Throughout the world, 32.9 percent of tank ship carrying capacity was owned by oil companies, 55.4 percent by non-oil companies, and 11.7 percent by various governments. On January 1, 1949, the oil group owned 47.1 percent, non-oil interests 36.9 percent, and governments 16.0 percent. In this same time period there has also occurred a pronounced decline in the portion of the world fleet owned by United States oil companies. In January of 1949 this was 33.1 percent, and in October of 1952 only 25.6 percent.

As of October 1, the average speed of all oil company vessels was 13.5 knots, nearly ½ knot faster than the 13.1 knots recorded for non-oil company ships. Government owned vessels were considerably faster, 14.4 knots, although with the exclusion of the extremely fast (16.2 knots) United States military fleet and the few vessels owned by the Maritime Administration this average drops to 12.7 knots.

Table I provides reasonable limits within which 1957 fleets will fall. In this compilation it has been assumed that there will be no interflag transfers nor any deliveries prior to the end of 1957 of vessels not now on order. The major fleets are then shown on two bases, first with no scrappage or losses, then with full deletion of all vessels over 20 years of age.

Under either scrappage assumption, and with full allowance for a wide margin of error in the no-transfer assumption, the Sun Oil Co. statistical research division reached two conclusions. First, the future rate of growth of the United States tanker fleet will be far out-stripped by that of other major owners, and second, the British fleet will surpass the U.S. in carrying capacity by the end of 1957.

TABLE III

ANALYSIS OF UNITED STATES FLAG PRIVATELY OWNED TANK SHIP FLEET AS OF OCTOBER 1, 1952

Ocean-Going Vessels 2,000 Gross Tons and Over

Owner (Including Subsidiaries)	No.	dwt	Average Speed
OIL COMPANIES			
The Atlantic Refining Co.	13	226,600	14.0 K
Barber Oil Corp.	8	133,800	14.5
Cities Service Oil Co.	18	300,600	14.6
Gulf Oil Corp.	38	590,600	13.7
The Pure Oil Co.	9	120,100	14.1
Sinclair Refining Co.	10	147,700	14.6
Socony-Vacuum Oil Co., Inc.	21	339,600	14.8
Standard Oil Co. (Ind.)	12	182,800	13.6
Standard Oil Co. (N. J.)	54	949,400	14.7
Standard Oil Co. of Calif.	13	173,800	14.2
Sun Oil Co.	18	280,800	13.6
The Texas Co.	22	332,200	14.7
Tide Water Associated Oil Co.	14	191,900	12.8
Union Oil Company of Calif.	7	106,900	14.1
Other Oil Companies	31	548,100	14.9
Sub-Total Oil Companies	288	4,624,900	14.3
NON-OIL COMPANIES			
Bernuth, Lembcke Co., Inc.	5	67,400	13.3
Colonial Steamship Corp.	5	64,800	12.8
Independent Tankships, Inc.	6	100,000	15.5
Keystone Tankship Corp.	6	100,300	14.5
Charles Kurz & Co., Inc.	7	97,900	13.4
National Bulk Carriers, Inc.	20	368,600	15.6
No. Amer. Shipping & Trading Co., Inc.	6	100,000	14.5
Paco Tankers, Inc.	10	141,300	13.4
Southern Trading Co.	5	84,000	14.5
U. S. Petroleum Carriers, Inc.	7	117,000	14.5
Other Non-Oil Companies	63	884,800	13.4
Sub-Total Non-Oil Companies	140	2,126,100	14.1
TOTAL U. S. PRIVATELY OWNED FLEET	428	6,751,000	14.2

Japanese shipyards busy

OIL TANKER BUSINESS in Japan is booming, both as regards construction for domestic firms and for export sales to such countries as Norway, Denmark, Panama, Liberia, Greece and the United Kingdom.

A super-tanker, the Yuho Maru of the Iino Marine Transportation Co., was launched on April 7. This 18,200 gt vessel is the largest oiler built in Japan.

Iino Marine is the leading Japanese tanker firm, with 11 owned tankers, excluding the Yuho Maru, with gross tonnage of 136,566 and deadweight of 205,764. The Yuho Maru will be followed off the Harima ways by its projected sister ship, the Koho Maru, also of 18,200 gross and 28,000 dwt, which was started in July 1952 and which will be completed in June. Both oilers have turbine type engines, 14,000 hp, L.R. classifications, and a sea speed of 16 knots. The Yuho cost $183 per deadweight ton for a total of $5,138,889, while the Koho, at a deadweight ton cost of $198, will total $5,555,555.

Iino Marine has also received a loan of $2,400,000 from the Bank of America to construct another tanker, this unnamed as yet, which will be L.R. classification, grossing 13,100 and deadweighting 20,500 tons, turbine, 8,500 hp, already started at the New Mitsubishi Heavy Industry yards in March this year, to be completed this December. Speed will be 14.75 knots, it is stated.

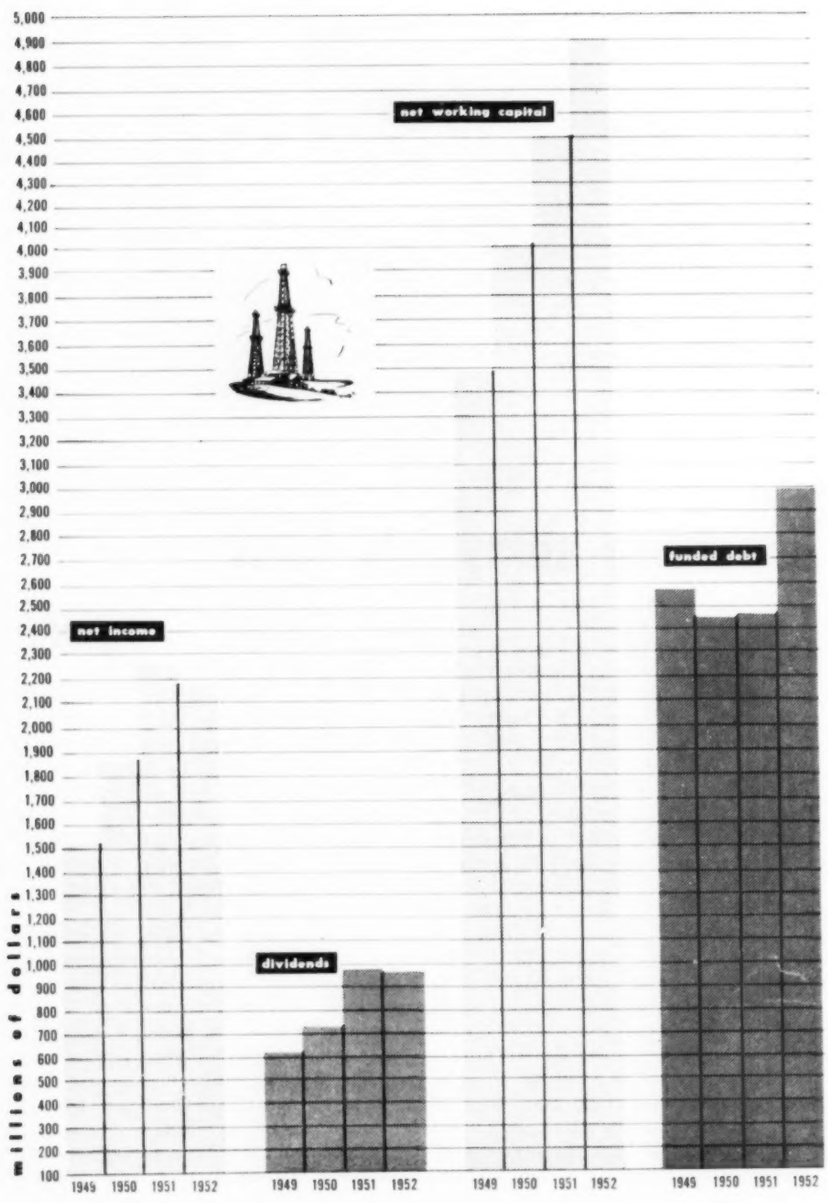
Following is up-to-date information on Japanese tankers under construction for Japanese use, as of March 15, 1953: Mitsubishi Marine Transportation, San Luis Maru, 18,208 dwt, diesel, 8,500 hp. A.B., 14.5 knots. Started May 1952, completed March 1953. Built at Mitsubishi Nippon Heavy Industry. Total cost $4,208,333, unit cost $231 per dwt.

Meiji Marine Transportation, not yet named, 19,664 dwt, turbine, 8,000 hp.

The 28,000-ton Japanese super tanker Yuho Maru ready for launching at the Harima shipyard.

(Please turn to page 88)

CONTINUED GROWTH OF OIL INDUSTRY



Comparison of net working capital, funded debt, net income, and dividends paid by oil companies in the past four years.

REFLECTED IN 1952 ANNUAL REPORTS

A COMPILATION of 1952 financial statements of 30 leading oil companies operating in the United States shows the first reduction in net income since 1949. Net of the 30 companies in 1952 dropped four percent to $2,178 million. The same companies earned $2,268 million in 1951 and $1,878 million in 1950.

A combination of factors led to the decline in earnings. The oil strike adversely affected many companies and the shut down in the steel industry reduced the business done by almost every company. Even without the steel strike, there was a tendency for sales to be somewhat lower than had been anticipated. Meanwhile, the upward trend of costs continued to affect the industry.

Of the 30 companies, 11 reported higher profits while 19 had earnings below the 1951 level.

Socony-Vacuum Oil Co. increased its earnings $9.5 million, Sinclair Oil Corp. $4.6 million and Sunray Oil Corp. $3.4 million. The Texas Co. earned $2.5 million more in 1952 than the previous year, Phillips Petroleum Co. $1.6 million, Gulf Oil Corp. $1.8 million and Pacific Western Oil Corp. $1.2 million. Lesser increases were reported by Standard Oil Co. of California, Union Oil Co., Texas Gulf Producing Co. and Seaboard Oil Co.

Cash dividends paid by the 30 companies totaled $974,657,000 in 1952. This was nearly 45 percent of net earnings and compares with a payment of 43 percent of earnings in 1951 and 40 percent in 1950. Dividends averaged $2.66 per common share and net earnings $5.95 per share.

Only two stock splits were made among the major companies in 1952 as compared with eight the previous year. Atlantic Refining Co. and Tide Water Associated brought the recent total of 100 percent stock dividends to 10 among the 30 domestic companies covered by this report. Smaller stock dividends continue year by year. Notable is the case of Sun Oil Co. which has the habit of issuing such a dividend each year as a method of reinvesting earnings in the business without materially changing the equity in individual shares. In 1952 the Sun stock dividend was eight percent and represented a transfer of $39 million from "earnings employed in the business" to common stock. The Tide Water Associated stock dividend made a similar transfer of $64 million. Gulf Oil Corp. followed its 1951 stock split with an additional four percent stock dividend in 1952, thus transferring $45 million to the capital account.

In one important instance the sale of common stock was employed to bring new capital into a major company in 1952. Socony-Vacuum Oil Co. raised $95 million through the sale of common shares. Stockholders were given rights to buy stock at $31 per share and an issue of 3,180,188 shares was sold.

Stock dividends and sale of additional shares increased the total outstanding to 365,253,336 shares at the end of 1952. This compares with 346,593,874 shares in 1951 and 251,187,244 shares in 1950.

Other major financing was accomplished largely by additions to long term debt. The 30 domestic companies studied here increased their long term debt $417.7 million during the year to $2,999.6 million.

Standard Oil Co. of Indiana brought $105 million into the business in 1952 to help finance its major expansion program. The money was obtained by selling a $139 million issue of 30-year convertible debentures, the largest such issue ever offered by an industrial company. Standard of Indiana has spent more than $1,250 million since the end of World War II for added facilities. The 1952 capital expenditures totaled $204 million compared with $483 million the previous year.

Phillips Petroleum Co. was another major borrower in 1952 to finance a continued expansion program. Chemical manufacturing and pipe lines took much of the new money. Total long term debt of Phillips increased $84.7 million to $177 million. The company's capital expenditures for the year totaled $190 million, of which more than half came from earnings.

Heavy capital expenditure also necessitated substantial increases in funded debt by ten other companies out of the group of 30. Cities Service reported $89 million in capital expenditures and increased its funded debt $56 million. Working capital was increased $35 million through the financing.

The Texas Co. increased its debt $46 million while adding $236 million to plant investment. Union Oil Co. of California invested $71 million in new properties, of which $35 million was paid for by the sale of convertible debentures. Continental Oil Co. continued its heavy expenditures, adding $91 million to properties and borrowing $32 million to help pay for the expansion. Sinclair Oil Corp. spent $181 million on expansion in 1952, a new peak for that company. The sale of debentures increased long term debt $33 million.

Lion Oil Co. resorted to sale of both common stock and debentures to bring in new capital for construction of a new chemical plant and other expansion. The common stock sale brought in $15 million and the debentures a like amount.

Through the medium of increasing the funded debt and plowing back 55 percent of earnings into the business, the 30 companies increased their net working capital $405 million, or nine percent, to $4,912 million, and their net capital assets $1,178 million, or nine percent, to $14,340 million during the past year. In 1951 the same companies increased their working capital 12 percent and net capital assets nine percent.

The accompanying tabulation of financial results of various companies includes figures for two foreign affiliates, Creole Petroleum Corp. in Venezuela and Imperial Oil Ltd., in Canada. Results reported by these foreign companies are not reported in the totals given above except as they may be reflected in the reports of parent companies.

The report as a whole gives another impressive indication of the growth characteristics of the domestic petroleum industry.

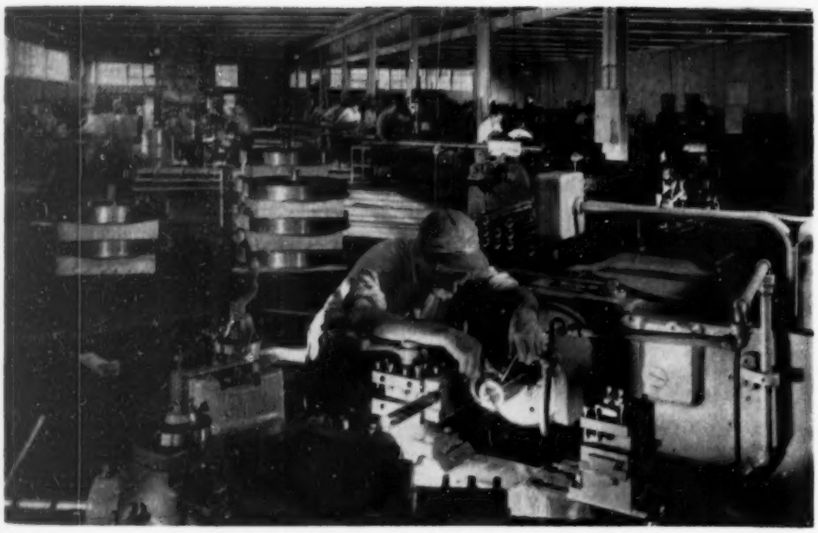
FOUR YEARS FINANCIAL REVIEW OF

	Net Income	Per Share of Com.	Net Working Capital	Net Capital Assets	Funded and or Long Term Debt	No. of Pref. Shares	No. of Com. Shares	Surplus
Amerada Corp.								
1952	$ 15,896,000	$5.04	$ 26,697,509	$ 55,087,445			3,154,700	$ 79,986,746
1951	16,276,652	5.17	27,083,318	48,083,598			(H) 3,154,700	73,554,485
1950	15,399,607	9.75	24,062,549	43,941,394			1,577,350	57,257,833
1949	14,384,193	9.12	21,343,683	40,883,360			1,577,350	51,322,326
Atlantic Refining Co.								
1952	40,476,692	4.37	52,710,676	525,753,009	$31,367,659	352,000	(H) 8,961,977	254,192,532
1951	45,067,298	12.20	71,549,052	481,541,936	37,479,000	352,000	3,584,791	232,061,880
1950	40,841,508	13.09	65,979,784	278,356,802	33,120,557	352,000	2,987,326	202,651,286
1949	27,210,432	9.51	54,697,673	271,811,844	34,534,054	477,980	2,660,911	179,954,862
Cities Service								
1952	49,258,000	12.67	237,700,000	674,120,703	419,286,593		3,689,077	404,412,038
1951	57,177,000	14.71	201,935,592	620,628,334	363,053,822		3,889,077	(C) 374,588,947
1950	56,659,025	14.57	182,893,128	590,717,688	354,844,281		3,889,077	(C) 338,296,843
1949	55,057,822	14.16	180,542,106	612,656,329	423,944,945		3,702,000	(A) 290,366,048
Continental Oil Co.								
1952	38,087,890	3.91	61,211,500	218,331,246	32,090,741		9,736,916	229,243,355
1951	41,292,672	4.25	50,917,770	189,849,331	340,697		(H) 9,716,916	215,115,907
1950	42,406,666	8.73	69,198,132	156,478,852	400,869		4,858,458	221,926,717
1949	36,096,880	7.48	57,100,861	152,660,705	1,427,783		4,823,858	202,397,966
Creole Petroleum Corp.								
1952	220,931,000	9.54	181,628,100	513,871,589			25,865,310	391,191,927
1951	202,278,300	7.82	172,820,500	473,058,000			25,865,310	351,318,113
1950	166,930,337	6.45	107,225,478	473,899,905			25,865,310	297,765,346
1949	116,149,079	4.49	7,749,771	491,112,483			25,865,310	218,777,063
Gulf Oil Co.								
1952	141,820,000	6.01	366,744,000	823,005,470	181,729,800		23,598,120	475,874,189
1951	140,071,000	6.17	325,725,000	785,045,048	185,023,669		(H) 22,690,500	424,815,861
1950	111,139,605	9.80	255,627,511	708,965,875	185,301,460		11,345,250	614,967,783
1949	100,877,041	8.89	205,847,853	698,395,696	189,969,415		11,345,250	548,839,178
Houston Oil Co.								
1952	6,344,057	4.81	8,142,678	61,627,326	17,500,000		1,320,000	15,135,980
1951	7,053,640	6.42	6,683,530	54,500,464	11,900,000		1,100,000	22,648,331
1950	(C) 6,103,702	5.56	6,431,291	46,708,493	8,300,000		1,100,000	18,341,236
1949	5,786,727	5.26	6,927,688	44,368,994	8,700,000		1,100,000	21,536,279
Humble Oil & Refining Co.								
1952	145,292,144	4.05	116,450,247	854,366,087	51,171,879		36,000,000	456,970,024
1951	169,480,626	4.72	143,316,000	770,576,613	55,367,220		(H) 35,878,036	393,473,076
1950	129,359,991	7.20	152,914,043	679,566,241	57,764,972		17,975,660	304,854,492
1949	120,479,526	6.70	138,187,401	631,071,368	50,534,013		17,975,680	247,397,224
Imperial Oil, Ltd.								
1952	41,196,499	1.38	186,111,038	258,440,433	53,422,878		29,847,227	221,460,459
1951	35,951,153	1.20	217,608,973	209,593,207	55,808,725		29,847,227	204,340,216
1950	30,460,567	1.12	(C) 163,857,007	170,770,889	58,262,591		27,133,843	176,024,862
1949	23,932,935	.88	150,550,513	142,778,195	59,657,401		27,133,483	159,769,158
Lion Oil								
1952	10,211,425	3.30	26,207,331	74,930,620	38,750,000		3,090,884	49,827,134
1951	11,751,026	4.37	25,517,316	67,436,908	25,000,000		2,690,861	45,397,453
1950	13,986,245	5.98	14,654,736	58,582,040	25,000,000		2,340,833	38,503,127
1949	9,115,161	3.89	13,522,145	50,527,225	25,000,000		2,340,813	29,903,938
Mid-Continent Petroleum Corp.								
1952	15,596,497	8.39	60,536,199	126,656,367			1,857,912	127,073,134
1951	17,062,182	9.18	57,616,427	81,715,752			1,857,912	117,493,268
1950	15,662,632	8.43	52,069,834	76,822,095			1,857,912	108,299,666
1949	12,090,615	6.50	46,504,343	73,068,253			1,857,912	93,815,089
Ohio Oil Co.								
1952	39,354,021	6.00	62,975,828	169,156,526			6,563,377	154,934,924
1951	41,681,663	6.35	64,959,362	146,012,407			6,563,377	135,271,032
1950	37,349,903	5.69	57,483,269	134,269,828			6,563,377	113,279,499
1949	33,658,767	5.13	52,084,439	121,033,046			6,563,377	93,650,707
Pacific Western Oil Co.								
1952	8,968,934	1.86	14,501,574	129,040,279	39,567,162	1,325,000	4,534,224	32,406,100
1951	7,805,680	(F) 1.60	7,650,669	23,323,507	29,055,032	1,374,007	4,534,224	23,967,169
1950	5,863,638	4.27	4,054,653	19,607,952	15,000,000	1,353,607	1,374,007	21,208,985
1949	4,972,830	3.62	2,013,861	19,407,521	15,000,000		1,374,007	29,085,415
Phillips Petroleum Co.								
1952	75,284,261	5.17	45,395,973	675,952,572	177,391,026		14,563,093	320,142,734
1951	73,711,229	5.45	86,117,589	562,276,683	92,622,983		(H) 14,423,139	279,642,231
1950	51,557,264	8.51	93,689,850	465,758,945	123,837,693		6,084,968	237,452,779
1949	44,514,371	7.36	87,299,342	429,938,398	111,719,146		6,048,369	211,729,714
Plymouth Oil								
1952	9,648,095	3.97	14,816,098	75,647,384	14,788,227		2,429,967	26,801,045
1951	10,295,791	4.24	13,784,597	40,765,285	14,219,946		(H) 2,427,785	27,430,264
1950	8,498,425	7.01	9,396,626	39,584,666	14,517,033		1,212,683	(C) 27,182,266
1949	6,171,587	5.12	8,429,122	35,792,395	14,701,746		1,205,925	22,184,673
Pure Oil Co.								
1952	27,304,373	6.17	84,775,375	366,717,219	28,353,800	442,434	4,067,727	212,201,709
1951	33,593,727	7.88	80,462,776	214,676,510	26,617,267	442,434	3,982,031	186,356,227
1950	30,329,084	7.36	67,253,125	207,241,213	27,671,066	442,434	3,982,031	164,927,609
1949	26,977,116	6.22	58,433,570	196,085,492	28,366,321	442,434	3,982,031	144,026,697

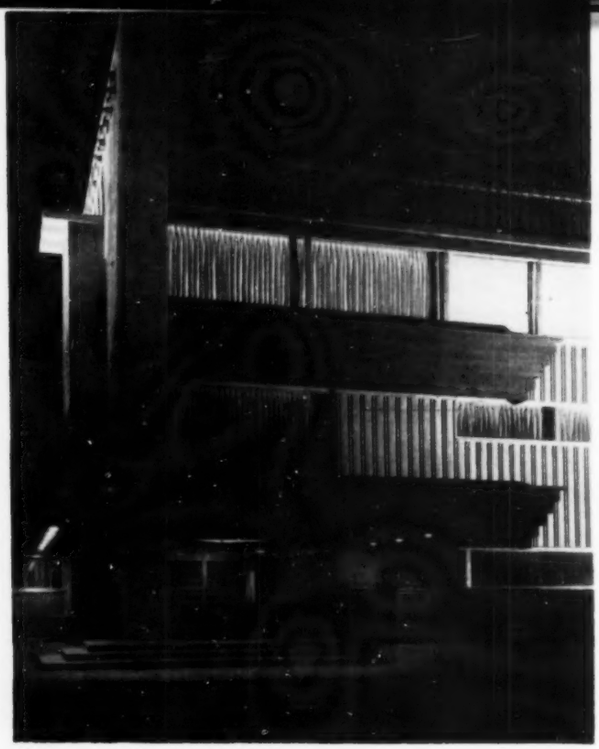
UNITED STATES OIL COMPANIES

	Net Income	Per Share of Com.	Net Working Capital	Net Capital Assets	Funded and or Long Term Debt	No. of Pref. Shares	No. of Com. Shares	Surplus
Richfield Oil Corp.								
1952	$25,624,998	$6.41	$65,111,251	$127,350,666	$50,000,000		4,000,000	$74,654,500
1951	28,218,281	7.05	61,685,893	119,596,046	50,000,000		4,000,000	63,029,502
1950	23,046,378	5.76	59,536,033	108,406,789	50,000,000		4,000,000	48,811,221
1949	20,434,099	5.11	64,663,772	92,927,181	50,000,000		4,000,000	37,764,842
Seaboard Oil Co.								
1952	6,511,962	5.34	12,814,754	44,370,909			1,219,323	16,390,594
1951	6,425,299	5.26	10,780,543	22,175,244			1,220,613	(B) 12,928,890
1950	6,106,621	4.99	9,427,656	17,892,426			1,223,123	24,799,775
1949	5,781,347	4.71	9,512,775	13,988,138			1,226,730	21,876,673
Shell Oil Co.								
1952	90,872,834	6.75	205,854,000	491,747,197	117,307,000		13,470,625	380,444,549
1951	97,020,194	7.20	203,581,836	429,613,053	117,307,000		13,470,625	329,983,590
1950	(C) 94,185,726	6.99	189,918,129	396,068,722	117,307,000		13,470,625	273,375,271
1949	76,422,775	5.67	146,406,432	343,920,204	120,672,000		13,470,625	211,815,035
Sinclair Oil Corp.								
1952	86,475,303	7.08	185,373,682	649,031,756	248,360,540		12,928,205	539,395,625
1951	81,899,490	6.78	210,566,678	530,708,538	215,384,829		12,077,604	480,029,556
1950	70,193,146	5.81	175,751,714	469,915,650	177,094,724		12,077,626	422,281,866
1949	54,073,338	4.51	192,670,120	418,045,905	182,410,088		11,973,984	380,968,272
Skelly Oil Co.								
1952	28,032,692	9.75	35,543,817	252,484,433	11,900,000		2,873,059	139,601,882
1951	31,074,985	11.89	28,422,405	176,082,837	12,400,000		2,611,872	127,239,544
1950	29,514,066 (D)	10.91	27,656,120	155,934,655	13,200,000		2,611,872	104,652,744
1949	26,196,500	20.04	19,732,410	140,489,953	14,000,000		1,306,134	128,190,677
Socony-Vacuum Oil Co., Inc.								
1952	171,092,000	5.27	463,021,000	980,499,000	168,075,000		34,464,000	983,361,409
1951	161,622,000	5.08	348,653,000	880,791,000	169,575,000		31,801,880	826,793,635
1950	128,216,683	4.03	314,519,119	819,633,241	173,000,000		31,801,880	691,414,860
1949	98,329,305	3.09	255,232,100	771,397,675	174,500,000		31,801,880	606,122,626
Standard Oil Co. of California								
1952	174,030,499	6.07	235,136,136	977,159,390	85,167,448		28,673,192	799,746,394
1951	173,341,211	6.05	232,466,502	903,492,635	94,501,727		28,673,192	711,735,471
1950	150,804,105	5.26	189,925,412	852,475,966	95,210,531		28,673,192	612,926,319
1949	(C) 136,017,835	10.10	237,858,559	772,735,397	140,235,048		13,654,150	543,742,703
Standard Oil Co. of Indiana								
1952	119,981,438	7.81	412,265,204	1,239,608,852	355,260,410		15,361,202	972,810,073
1951	148,697,356	9.71	323,485,854	1,137,879,551	250,350,978		15,320,249	888,585,192
1950	123,581,477	8.09	304,757,868	1,049,056,793	261,620,025		15,284,772	783,598,396
1949	102,668,228	6.72	269,263,654	1,022,452,070	286,946,517		15,284,772	701,223,890
Standard Oil Co. (N. J.)								
1952	519,981,000	8.58	1,294,408,000	2,518,551,000	459,445,000		60,571,092	2,184,901,385
1951	528,460,779	8.72	1,206,514,211	2,272,915,854	440,973,256	(H)	60,571,092	1,957,718,665
1950	408,223,223	13.48	1,047,131,127	2,125,404,704	441,024,197		30,285,546	1,830,374,554
1949	268,869,501	8.91	847,264,604	2,085,721,726	475,710,293		30,183,394	1,572,656,868
Standard Oil Co. of Ohio								
1952	17,697,083	4.20	73,282,421	158,847,410	36,927,869	231,550	4,010,481	139,857,464
1951	23,164,581	5.56	71,530,669	155,403,855	38,368,393	236,922	4,010,067	132,627,644
1950	20,221,345	5.30	62,847,977	136,023,718	17,089,265	242,294	3,642,720	108,321,561
1949	16,142,164	4.26	58,321,473	128,821,813	36,543,089	247,900	3,574,371	96,963,696
Sun Oil Co.								
1952	43,013,063	6.01	88,187,675	264,614,939	10,350,000	93,197	7,161,865	(E) 57,848,351
1951	45,353,643	6.85	93,362,290	219,918,557	6,880,000	93,197	6,564,231	(E) 60,723,474
1950	36,291,498	6.02	78,215,209	197,626,162	7,690,000	93,197	5,967,624	(E) 57,602,416
1949	25,177,875	4.57	56,270,746	183,879,729	6,000,000	93,197	5,427,483	(E) 52,254,581
Sunray Oil Co.								
1952	27,724,411	2.30	36,064,375	285,246,325	78,000,000	1,567,574	9,990,210	143,499,860
1951	24,282,516	2.23	32,375,633	221,819,411	78,000,000	1,682,036	9,966,400	131,954,070
1950	20,462,878	2.97	33,528,394	212,136,101	78,000,000	2,784,569	8,455,352	99,596,608
1949	10,846,070	1.77	19,342,939	99,112,866	26,000,000	1,751,227	5,052,143	20,237,090
The Texas Co.								
1952	181,242,172	6.59	464,126,528	957,085,922	226,288,949		27,595,248	639,568,264
1951	178,774,677	5.50	385,699,764	844,195,786	180,252,197	(H)	27,510,693	534,835,584
1950	149,071,743	10.82	346,281,902	789,034,178	178,805,442		13,774,881	784,935,922
1949	132,743,159	9.62	321,188,140	742,055,255	180,128,177		13,787,624	686,659,536
Texas Gulf Producing Co.								
1952	3,185,488	5.18	3,634,340	18,400,075	2,350,000		1,107,064	8,806,380
1951	3,152,765	2.85	2,504,015	17,891,756	2,350,000		1,097,928	6,959,220
1950	(C) 3,047,506	2.75	1,973,205	16,896,060	2,400,000		1,106,000	5,356,492
1949	3,381,359	3.13	2,125,816	16,392,892	4,000,300		1,080,707	3,892,676
Tide Water Associated Oil Co.								
1952	31,117,000	2.43	85,010,971	191,251,000			(H) 12,793,618	165,721,392
1951	37,060,606	5.79	81,733,790	179,597,757			6,396,809	213,399,338
1950	33,364,115	5.17	65,250,178	176,299,743			6,396,609	190,091,871
1949	27,518,705	4.20	62,886,797	176,302,398		172,135	6,396,809	167,952,298
Union Oil Co. of California								
1952	27,579,759	5.07	73,066,554	305,437,161	118,203,207	237,885	5,266,270	122,653,656
1951	27,295,971	5.01	50,101,535	280,666,765	88,906,549	242,500	5,266,270	95,073,897
1950	17,177,547	3.09	57,635,576	254,500,960	79,400,000	245,000	5,266,270	79,222,185
1949	20,356,946	3.69	58,670,963	249,372,269	79,700,000	247,500	5,266,270	82,192,931

(A) Includes profit of $27,170,082 on sale of investments. (B) After transfer of $13,870,884 to capital stock account. (C) Adjusted by company. (D) Stated on basis of new capitalization. (E) After deductions for stock dividends. (F) Restated on basis of 4,534,224 shares of common outstanding 12/31/51. (G) Giving effect to Barnsdall Oil Co. merger in 1950. (H) By two for one stock split.



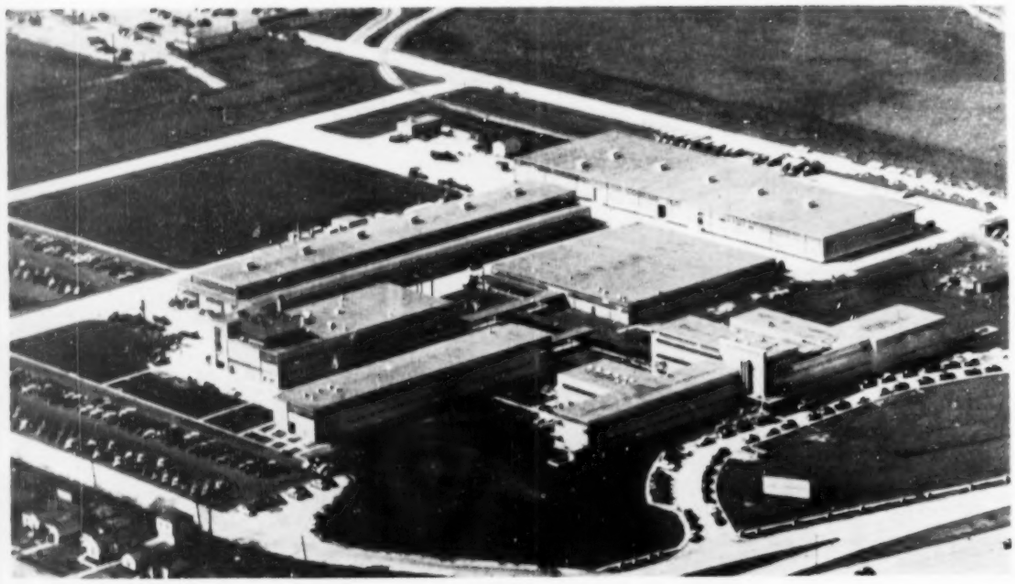
A portion of the machine shop.



Entrance to the main building.

Schlumberger opens new headquarters plant at Houston

Aerial view of the six new Schlumberger buildings.



SCHLUMBERGER Well Surveying Corp. formally opened a new $6 million headquarters at Houston on May 4. New center of the world-wide service organization consists of six modern buildings spread over a 36-acre site on the Gulf Freeway.

The new headquarters is a physical expression of the idea of Conrad Schlumberger, a young student in the Ecole Nationale Superieure des Mines in Paris in 1911, who experimented with electrical currents through buried conductive materials. The idea first was employed in the petroleum industry in Romania in 1925. Two years later in Alsace the first bore hole resistivity diagram was produced. By 1929 three crews were working in France and Venezuela and a fourth was trying to get business in the United States.

Today Schlumberger offers 25 services to the petroleum industry on a world-wide basis. With 2,800 employees, it has 100 field offices and 350 units in North America alone.

Major structure of the new Houston group is the administration building, which is 300 feet long, with three 84-foot wings. The building consists of a three-story center bay with two-story wings. An ornamental pylon of three columns with reflecting pool and plant box at its base flanks the entrance. Walls or rooms and corridors are panelled with Limba wood, a white mahogany. This building is planned for a possible expansion of 150 percent without marring its appearance.

Of contemporary design throughout, the buildings present an attractive facade

of pink Clinton brick highlighted with aluminum paneling. All buildings are of steel and masonry construction with steel frames making each a structure that supports itself. The roof is supported by the steel, and the walls merely fill in the frame like curtains. Walls may be removed without disturbing the frame or support of the building.

The two-story engineering building, which is 54 feet wide and 254 feet long, houses 12 electrical engineering laboratories on the first floor. One of these has double walls of sheet iron plating to reduce electrical interference in the testing of sensitive equipment. Another laboratory is for the purpose of testing neutron logging equipment and gamma ray units, and a third is designed for core measurements.

Set in one corner of the engineering building is a laboratory housing facilities for the improvement of radio-activity logging. This laboratory is surrounded by concrete walls two feet thick to protect others in the building from radiation and special radiation monitors are installed in this lab so that those in the room will avoid over-exposure.

Two large pits 32 feet deep and about 10 feet in diameter are set in the floor of this laboratory. One is for testing neutron logging equipment and is filled with layers of limestone with varying fluid content. The other is filled with materials containing known amounts of radioactive matter for use with gamma ray units. A movable hoist facilitates lowering and raising equipment in the pits.

Adjoining the engineering building is an "elephant bath" where engineers can vary the resistivity of water in the bath and duplicate well conditions.

The building has an unusual distribution center that connects with each of the 12 laboratories and makes it possible to supply special kinds and amounts of electrical power. The system enables an engineer to conduct tests, almost under field conditions, in a laboratory without having to leave the room or bring in additional equipment.

The second floor of this building contains an extensive engineering library, administrative offices and a large mechanical drafting and designing room.

The electrical production and machine shops occupy one of the largest buildings at the new plant. It is here that Schlumberger tools are manufactured.

A gamma ray wash room is one of the special features of the shop. This is where all parts for gamma ray detector tubes are washed, and the room is built to insure better-than-hospital cleanliness, which is necessary in the production. The gamma ray room has its own air conditioning unit.

Schlumberger builds its own trucks in a shop capable of turning out 12 new surveying units a month on an assembly line basis.

First of the new buildings to reach completion was the 49,000 square-foot warehouse, which brings under one roof all the supplies and equipment that were previously housed in six buildings at four different locations in Houston. The warehouse is served by railroad spur and truck docks. Fork lift trucks are used to handle materials within the building.

A special high-pressure laboratory is located in the engineering test and power building. The unusual construction of this laboratory allows the removal of high window sections for passage of long test cylinders. With equipment in this laboratory, engineers are able to duplicate temperatures and pressures that may be expected in 25,000-foot wells.

Focal points of this unusual laboratory are two test wells, or "pressure tubes." One well, five and one-half inches in diameter and 25 feet deep, will be used for testing electrical logging tools. The second, 14 inches in diameter, has been designed to permit placing oil well casing or simulated underground formations around the tools to be tested. The pressure in each well can be raised to 25,000 psi. The temperature of test wells can be raised to 400°F. Logging tools for deep wells are built to withstand these extreme conditions.

The engineering test and power building also houses power installations for supplying the entire plant, instrument maintenance shops, credit union, first aid station, and an employees' cafeteria. Complete air conditioning equipment is also installed in this building. Pipe systems conduct heated or chilled water to transfer coils in each building where fans circulate air warmed or cooled by the coils to the various rooms. An ingenious control system makes it possible for some rooms to be using heating and some cooling in the same building.

Schlumberger employs one man in research for every ten men in the field. The result of this emphasis on research is seen by the four new services that the corporation introduced in 1952. Neutron Logging, the Expendable Shaped Charge, the Continuous Dipmeter and the Microlaterolog.

Neutron logging complements the multi-purpose gamma ray curve and may be recorded in cased holes, empty holes, and in all kinds of drilling fluid. It can also be used as a means of depth control on perforating operations.

The Expendable Shaped Charge Perforator is a development for perforating casing below the tubing. The gun offers a last resort possibility of perforating both tubing and casing, should the two strings of pipe be inadvertently cemented together. The gun is run with a specially designed collar locater which locates collars in both tubing and casing below the tubing, as well as indicating the depth of the bottom of the tubing.

The MicroLog Continuous Dipmeter is a new improved instrument with which the information used for the determination of the dip is obtained by three Micro-Log curves. These three curves, as well as the orientation of the instrument and the inclination of the bore hole, are simultaneously and continuously recorded over the entire bore hole.

The Laterolog is a new resistivity method employing automatically controlled opposing voltages which prevent the surveying current from spreading up or down the hole through the mud column, so that the current is effectively focused in a thin sheet on each successive formation. As a consequence, the reading represents essentially the resistivity of the formation opposite the electrode system. Furthermore, because the current is focused, the effect of the mud column on the measured resistivity can be neglected. For this reason the Laterlog gives accurate formation detail when the ratio of formation resistivity to mud resistivity is high, i.e., in salt saturated muds and in hard formations.

Schlumberger officials, seated, left to right: D. C. McCann, vice president operations and services; W. J. Gillingham, executive vice president; P. Schlumberger, president; E. G. Leonardon, director in charge of special assignments; and A. Blanchard, vice president-engineering. Standing: A. Vennema, vice president-personnel; A. J. Peissel, assistant to the president; W. M. Padgett, controller; R. R. Ricke, sales manager; and W. B. Steward, assistant to the president.

Greatly increased drilling activity in the past year coinciding with a diminution in the rate of rise in oil consumption has created a reserve producing capacity in domestic fields of about one million barrels per day. Political pressures are being applied in Washington as a result of the economic pressures in the industry.

The accompanying article was written by Mr. Brantly as a paper for an API district chapter meeting some time ago, prior to his joining the Petroleum Administration for Defense. It is reproduced here because the editors of WORLD PETROLEUM believe that it is a clear statement of the national problem which is currently causing such acrimonious discussions on the part of strictly domestic producers seeking to restrict imports.

Mr. Brantly highlights the national interest in the maintenance of a reserve producing capacity even larger than at present. He points out the necessity of an adequate reward to the domestic producer who is asked to develop and shut in oil potential for a possible future national emergency, and suggests certain steps that government may consider in achieving the desired end.

Mr. Brantly has recently retired as Assistant Deputy Administrator in charge of Foreign Operations of the Petroleum Administration for Defense. He retired as president of Drilling and Exploration Co., Houston, in May 1952 and was "drafted" for the Washington assignment. He is author of the Rotary Drilling Handbook, now in its fifth edition, which has been the standard work on drilling techniques for many years. Before forming his own company, he was head of the geological department of the Atlantic Refining Company.—Editor.

The national interest in reserve producing capacity

By J. E. Brantly

THE SECURITY of the nation demands that adequate or reasonable quantities of strategic raw materials and sufficient manufacturing capacity to process them be available for immediate use in the event of an emergency. Strategic ores and minerals that occur within the continental limits of the United States must be blocked out in the mines, and many should be stockpiled on the surface.

Strategic minerals that are not available in this country must be purchased abroad from those nations that can produce them, and stored in areas readily accessible to the industries and manufacturing plants that use them. Non-perishable essential minerals, ores, metals, and commodities may be stockpiled in the crude state or as single processed or finished products. Iron ore, for example, may be stockpiled as such or as pig iron, steel billets, rails, tubular goods and other heavy tonnage products requiring little labor in their manufacture and that will not deteriorate or become obsolete. Copper, lead, zinc, aluminum, and other such metals and their ores may be stockpiled in similar crude, semi-finished or finished forms. Non-perishable farm products may be stockpiled as such.

Perishable commodities, or those which become readily obsolete, can only be provided when and as needed for emergency use. There must be the ability and capacity to produce those perishable foodstuffs that may be required. There must be the ability and the capacity to manufacture the machinery, vehicles and munitions of war, and the essential items required for self-preservation and for our efficient domestic existence. Some manufactured articles, in addition to those mentioned above, can be stored for emergency. The great majority of them, such as airplanes, radio equipment, war machines, and an almost endless list, must be on hand for normal use and for contingencies. They also must be built in quantity as needed, however, because of loss, obsolescence and improvements that are constantly going on in such products and in their manufacturing plants.

Our industry, our economy, our culture, our plans for defense, and our plans for living are built around liquid fuels and lubricants that are derived from petroleum. Without an adequate supply of this essential commodity and its essential products, all phases of activity in our country would break down and it would find itself in a more or less helpless position, either in war or in peace. Oil reserves cannot be discovered and brought into production in a few days time; years are required. This means that we must have available for our immediate use in normal times and in the event of emergency that quantity of oil that is required by the nation in its various endeavors to allow it to function in the manner necessary under the then existing conditions.

In 1952 the nation should require about 7,000,000 barrels of oil daily. In times of emergency our national defense organizations in their various ramifications would require about 2,500,000 barrels daily. Allowing for a 1,000,000 barrel cut back in civilian daily consumption, we may estimate that the nation in all of its activities and for all of its purposes will require about 8,500,000 barrels of petroleum and its products daily in the event of all-out war. These figures are high approximations and should hold for the next year or two.

At the present time the wells of this country are not capable of producing this amount of oil within the maximum efficient rate or at even safe rates of production for any reasonable length of time. If the estimates are correct that the minimum requirements of the nation will be 2,500,000 barrels daily for the use of defense organizations, in addition to that needed for civilian use and industries which are definitely necessary in the support of military establishments, then we may estimate that our "stockpile" of oil should be a minimum of 1,500,000 or even 2,500,000 barrels of daily production in excess of the amount consumed in this country today.

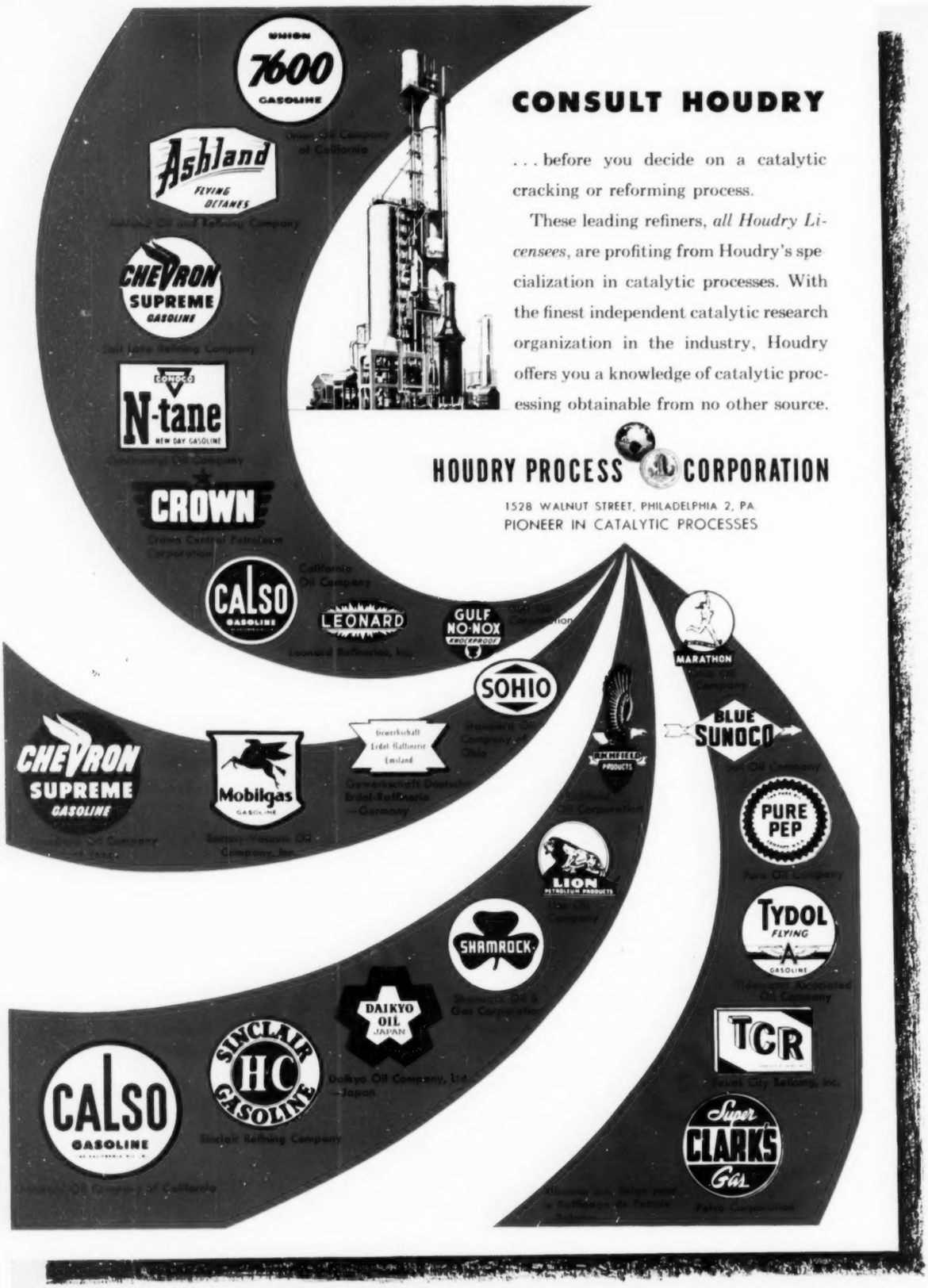
(Please turn to page 57)

Another milestone...

THE NEW SCHLUMBERGER HEADQUARTERS

At the new Schlumberger headquarters on the Gulf Freeway in Houston, the instruments, trucks and equipment are built to provide the oil industry with 25 specialized services throughout the United States and Canada.

SCHLUMBERGER
WELL SURVEYING CORPORATION — HOUSTON



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Oil can only be stockpiled practically and economically in proven reserves that have been developed by drilling the required number of wells. This means that oil fields must be discovered and developed and production cut back by an amount that will provide for emergency requirements. If these requirements are 2,500,000 daily, then this amount less saving by rationing, or 1,500,000, should be held in instant availability and this amount of daily producible oil should be set up as untouchable producible reserves that may be withdrawn at will by the manipulation of the valves at the well heads when an immediate need for the oil develops or until such emergencies can no longer occur without adequate advance notice.

At the present time, net imports of crude oil and products are approximately 500,000 barrels daily. For absolute safety, it should be assumed that all imports will be cut off in the event of war. Therefore, this 500,000 barrels daily should be added to closed in reserves, giving a total of 2,000,000 barrels daily as the logical "stockpile" of crude oil to carry, or 1,500,000 plus imports.

The requirements for the normal functioning and preservation of the nation are paramount and must have precedence over all other considerations. The ways and means of accomplishing the objective are of secondary importance except that they must fit within the framework and basic principles of the form of government under which we have lived for more than 150 years.

The oil fields of the country, according to estimates, are capable at the present time of producing approximately 7,750,000 barrels daily at the maximum efficient rate. Consumption in 1952 should be about 7,000,000 barrels daily, as already stated. Net imports amount to about 500,000 barrels daily. This means that we have closed in at the present time an estimated million barrels of daily production, though it is not known how long production could be maintained at this rate. Were the oil producers of the country required to close in an additional million barrels daily, this added shortage would have to be made up by increased imports from abroad. We would then need to build up imports by an additional 1,000,000 b/d and close in domestic fields in corresponding quantities. Fortunately, this amount of foreign production is available now or could be made available in a reasonably short time from American-owned wells in foreign countries that are friendly to this nation. Additional tankers would be needed. The proven reserves abroad are more or less equal to those of the continental United States. The unproven reserves are doubtless much greater. The further development of these unproven reserves would be needed, in present non-producing as well as in producing countries.

In times of war, transportation of petroleum by sea may be rendered difficult or even impossible in the quantities required. We are told that present day submarines and air forces would eliminate all defenseless vessels from the sea. In that event, the North American continent with some probable help from South America would have to supply our requirements.

In the past, with the consent, approval, and urging of the United States Government and the people of the United States, American capital represented by large and small companies and individuals went abroad to explore for and develop oil in certain countries where prospects were encouraging and whose laws permitted such development by foreign capital.

American capital was urged to undertake these financially hazardous ventures because of the apparently diminishing reserves in the United States.

These American oil finders working in foreign fields were eminently successful and now have available great reserves. From these reserves can be produced the amount of oil that would be required to supply all of America's needs, for a time, were our wells slowly or even suddenly to go dry. The success of the ventures was attended by great applause from the American people and the entire oil industry. These efforts, undertaken by American capital and experience, were not entirely unselfish and altruistic. Such ventures can never be, but they served the same purpose.

These American companies that have carried our "know-how" and capital resources to foreign areas, and there are many of them, are not monsters of intrigue and persecution, as they have been so often personalized and pictured. They are operated by able and patriotic citizens of this country. The individuals are the usual bold, resourceful oil country operators who may be found in any oil producing area. Have you ever heard of subversive characters amongst them?

These companies, large and small, are owned by the people of the nation to the extent of more than one million citizens. They support by employment almost as many more. They have great financial resources and they must have in order to undertake the very hazardous and costly exploration and oil field development in distant areas. They have rendered a great service in providing a reserve of oil available to the people of the world and to their own country. They have developed resources of many nations, thus aiding in bringing wealth and modern culture to them. They have made their products available to people of all nations. They have developed extensive markets for American products in all parts of the world. They are equipped to furnish the requirements of our nation for make-up oil in time of peace and in time of war, if the oil can be moved.

A prosperity in varying degrees has been brought to great oil producing nations such as Venezuela, Iraq, Iran, Saudi Arabia, Kuwait, Colombia, Peru, and Mexico—to say nothing of the United States. Political stability and a healthy economy for their people require that this source of income be maintained. The preservation of these great oil reserves in a "ready to serve" status demands that they be used and expanded continuously. The major part of the dollars gained by the nations selling oil to us is used to buy American goods, products of American labor.

The oil industry, in developing oil fields and producing oil, leaves in the hands of the people who own the land from which the oil is produced a greater proportion of the final income from the sale of its finished products than probably any other industry. Prosperity for the local people follows the development of oil reserves almost without exception. And this is true whether the "local people" are those of a farm, a county, a state, or a nation. And ours is almost the only industry in which there virtually has never been a shortage of products—except in times of war when civilian use was curtailed.

At the present time the oil producers of the nation are capable of supplying from their wells within the Continental United States the full requirements of the country with a possible surplus, as already estimated, of about half a million barrels daily. This ability to produce has been brought about by the discovery and development of new oil fields within the past two or three years. The use of the capital necessary to find and develop this oil has been encouraged and has been made possible by the price of oil and the tax laws under which the oil industry operates. Both have been essential to the development of the industry, and both will be essential to its continued progress and development. Without a fair price and without the return of capital through deduction allowed by the income tax laws, the risk capital could not have been and cannot be made available.

It is to the personal interest of those individuals and companies that do not produce oil abroad to prevent entirely or at least to severely limit the importation of foreign oil in order that their part of the oil industry may be preserved in *status quo* and prosper to the maximum possible extent. If their efforts to protect themselves and to advance their interests result in curtailment or elimination of imports, it would virtually destroy American foreign producers, and domestic reserves would be used at an excessive and dangerous rate. Producible reserves would not be available in time of emergency. It would doubtless be impossible also to maintain an adequate stockpile of producible reserves outside the United States, for under such conditions and without adequate sales, foreign producers could not maintain the all-important readiness to serve in times of stress.

American foreign producers cannot maintain themselves and support opera-

(Please turn to page 90)

WESTERN CANADA'S OIL RESERVES

PART II

By Theo A. Link and John A. Downing

Imperial Oil surveyor locates line to guide seismic crews in northern Alberta.

Stettler - Fenn - North Big Valley - Big Valley

Canadian Gulf Oil discovered the Stettler Field in June of 1949. This was the first of a series of discoveries by Gulf in that area. This field produces from the D-2 and D-3 of Upper Devonian age, with the D-2 being the larger pool. It is at present the most northerly of a trend of D-3 biohermal reefs from Stettler to Big Valley, a trend which is not clearly understood.

In all the fields on this trend the D-2 member is the most prolific oil reservoir, with the D-3 being a secondary or minor reservoir. It is of interest to note that the gravity of the D-3 oil is much less than that of the D-2 oil. The reservoir data for the Stettler—Fenn and North Big Valley Fields are listed below. (Also see Figure 8 on page 60 for contour map of area.)

Date: January 1953	Field: Stettler
Wells	
Completed	59
Ultimate Total (est.)	125
Acres/well	40
Acreage	
Developed	2,360 acres
Proved & Semi-proved	5,000 acres
Oil	
Gravity API	29.3°
Sulfur	1.4%
Gas	under-saturated
Production	
Average Depth	5,200'
Producing Formation	D-2 (dolomite)
Initial B.H.P.	1738 psig.
Present B.H.P.	1650 psig.
Gas Oil Ratio	400 cf/bbl.
Bbls./day	90 MPR Per Well
Reservoir	
Average Net Pay	60'
Average Effective Porosity	5.3%
Average Connate Water, % of Porosity	17%
Shrinkage Factor	0.81
Reserves	
Estimated Oil in Place (bbls.)	82,950,000
Recovery Factor	40%
Recoverable Oil—bbls/acre foot	110.6
Recoverable Oil—bbls/acre	6,636
Estimated Recoverable Oil, bbls.	33,180,000
Less Produced Oil, bbls.	992,000
Net Recoverable Oil, bbls.	32,188,000

Date: January 1953	Field: Fenn
Discovered by: Canadian Gulf—September 1951	
Wells	
Completed	28
Ultimate Total (est.)	75
Acres/well	40
Acreage	
Developed	1,080 acres
Proved & Semi-proved	3,000 acres
Oil	
Gravity API	32.6°
Sulfur	1.2%
Gas	Gas Cap
Production	
Average Depth	5,150'
Producing Formation	D-2 (dolomite)
Initial B.H.P.	1795 psig.
Present B.H.P.	1790 psig.
Gas Oil Ratio	440 cf/bbl.
Bbls./day	135 MPR Per Well

Silhouetted against a setting sun, a Socony-Vacuum seismic crew drills the last shot hole of the day before lowering the portable drilling rig and returning to base camp.

Reservoir

Average Net Pay	75'
Average Effective Porosity	7.7%
Average Connate Water, % of Porosity	17%
Shrinkage Factor	0.80

Reserves

Estimated Oil in Place (bbls.)	89,265,000
Recovery Factor	40%
Recoverable Oil—bbls/acre foot	158.7
Recoverable Oil—bbls/acre	11,902
Estimated Recoverable Oil, bbls.	35,706,000
Less Produced Oil, bbls.	348,000
Net Recoverable Oil, bbls.	35,358,000

Date: January 1953 **Field: North Big Valley**

Discovered by: Canadian Gulf—August 1952

Wells

Completed	6
Ultimate Total (est.)	60
Acres/well	40

Acreage

Developed	240
Proved & Semi-proved	2,400

Oil

Gravity API	32.1°
Sulfur	1.1%

Gas Gas Cap

Production

Average Depth	5,200'
Producing Formation	D-2 (dolomite)
Bbls./day	220 MPR Per Well

Reservoir

Average Net Pay	70'
Average Effective Porosity	8.7%
Average Connate Water, % of Porosity	20%
Shrinkage Factor	0.80

Reserves

Estimated Oil in Place	72,535,000
Recovery Factor	40%
Recoverable Oil—bbls/acre foot	172.7
Recoverable Oil—bbls/acre	12,089
Estimated Recoverable Oil, bbls.	29,014,000
Less Produced Oil, bbls.	74,000
Net Recoverable Oil, bbls.	28,940,000

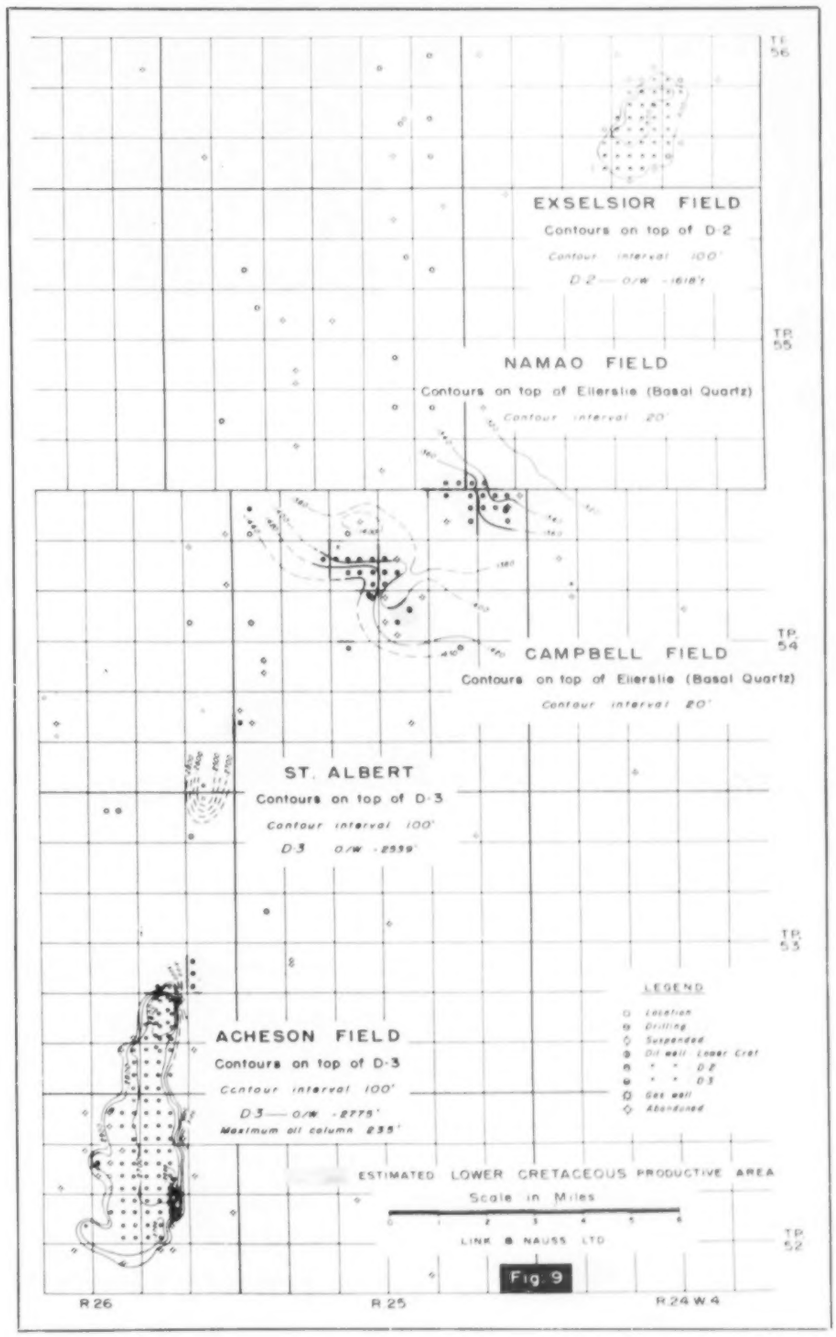


Fig. 9

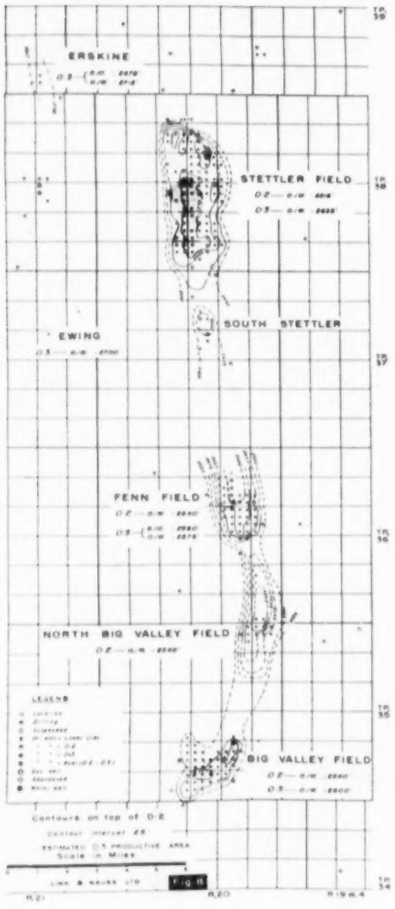
Acheson

California Standard, discoverer, prior to Leduc, of the first Devonian oil in Alberta (Princess), discovered the Acheson D-3 pool in September of 1950. Prior to this, Imperial Oil Limited had found what may be the western edge of the pool in August of the same year. The Acheson Field produces oil from the D-3, D-2 and Lower Cretaceous, with the first being by far

the most prolific. The D-3 bioherm, the reservoir for the field, is a continuation of the trend from Leduc—Woodbend through Acheson and St. Albert. The reef is narrow and elongated with steep flanks. The following is a computation of the reservoir data for the D-3 pool. (Also see Figure 9).

Date: January 1953	Field: Acheson
Wells	
Completed	81
Ultimate Total (est.)	88
Acres/well	40
Acreage	
Developed	3,240 acres
Proved and/or Semi-proved	3,510 acres
Oil	
Gravity API	36.6°
Gas	Gas Cap
Production	
Average Depth	5,000'
Producing Formation	Dolomite
Initial B.H.P.	1,722 psig.
Last Recorded B.H.P.	1,627 psig.
Gas Oil Ratio	380 cf/bbl.
Bbls./day	135 MPR Per Well
Reservoir	
Average Net Pay	82'
Weighted Average Effective Porosity	8.24%
Average Connate Water, % of Porosity	15%
Estimated Shrinkage Factor	0.80

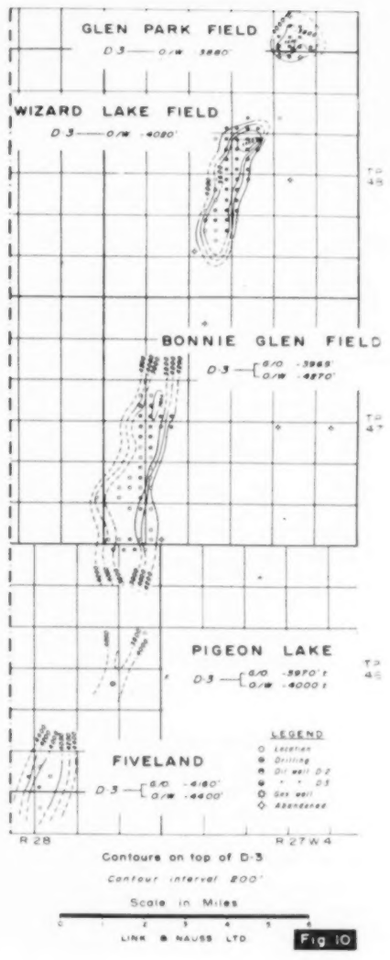
Manifold installations at Interprovincial Pipe Line's Edmonton, Alberta, pump station. Photo courtesy Imperial Oil.

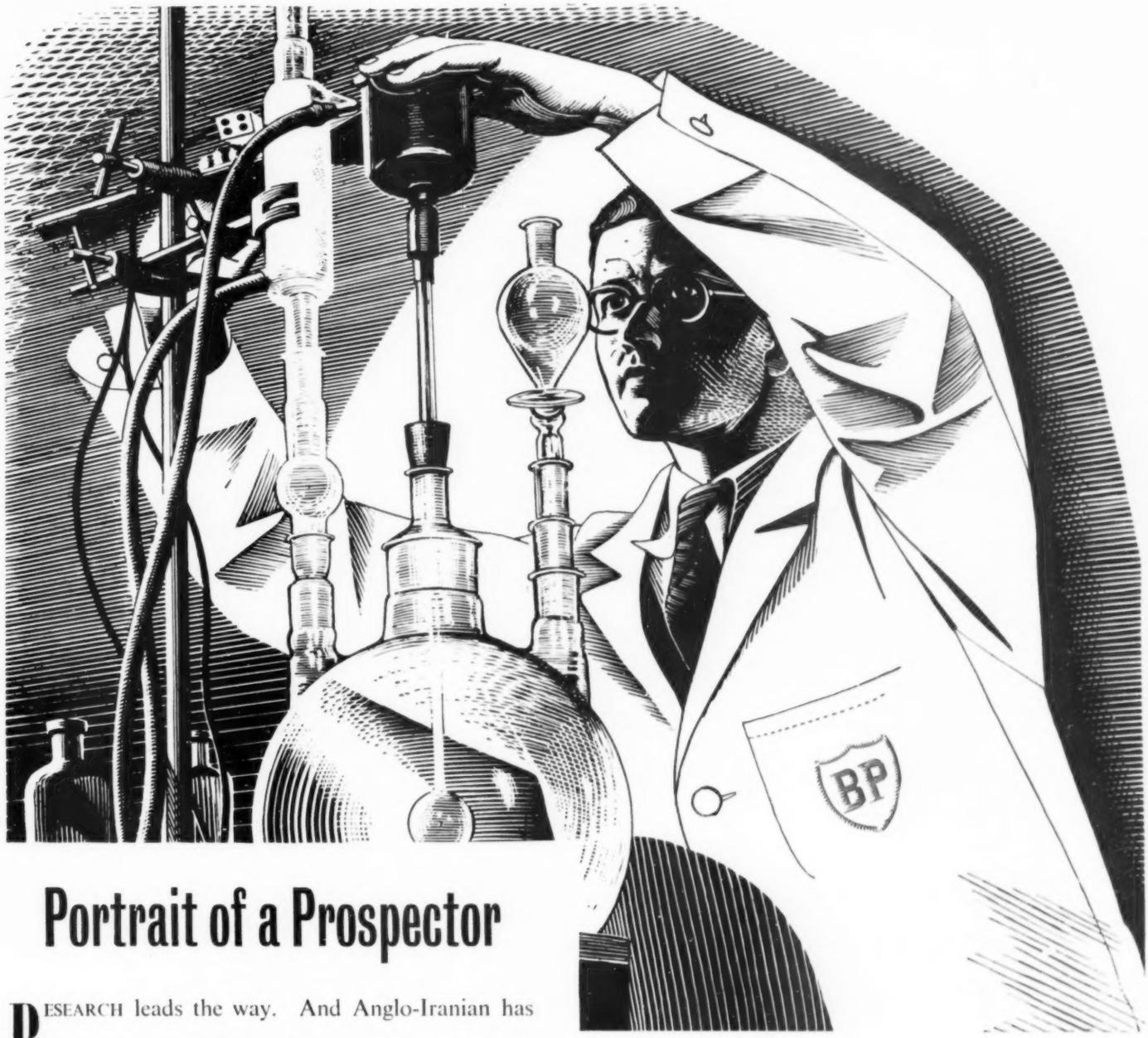


Reserves	
Estimated Oil in Place (bbls.)	125,146,000
Recovery Factor	50%
Recoverable Oil—bbls/acre foot	217.4
Recoverable Oil—bbls/acre	17,827
Estimated Recoverable Oil, bbls.	62,573,000
Less Produced Oil, bbls.	2,858,000
Net Recoverable Oil, bbls.	59,715,000

Wizard Lake - Bonnie Glen - Fiveland

The Wizard Lake Field, discovered by Texaco in May of 1951, was the first of a series of discoveries by that company and others in the Glen Park—Bonnie Glen—Fiveland trend of bioherm reefs. The discovery well found oil in the Lower Cretaceous and D-2 as well as over 600 feet of oil pay in the D-3. In January of 1952 Texaco again made a similar discovery at Bonnie Glen and extended it four miles during the summer. Gulf Oil, California Standard, Husky Oil and Phillips Petroleum followed up the same trend and discovered Fiveland. Both of these fields have large gas caps and a thick oil column. At approximately the same time as the Fiveland discovery, Stanolind Oil & Gas and California Standard were drilling their Pigeon Lake #1 well. This well discovered wet gas in the D-3 with only a very thin oil zone, estimated to be approximately 30 feet in thickness. At the time of writing the Fiveland Field had only two wells and very little reservoir data had been released. The recoverable reserves for this field have been estimat-





Portrait of a Prospector

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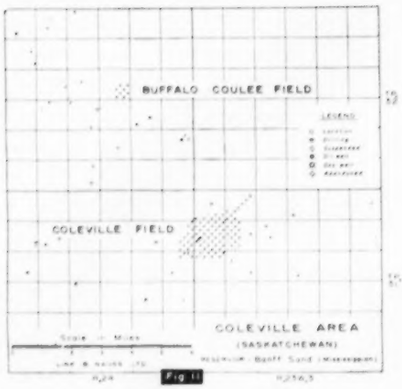

ed as 16,000,000 barrels. Undoubtedly the reserves will be much larger and the field could be as large as 100 million barrels of reserves.

The Glen Park D-3 Field, at the northern end of the trend, was discovered by British American in September of 1951. The recoverable reserves of this field are small but may be increased considerably by future development, particularly on the eastern flank. (See Figure 10).

Date: January 1953 **Field: Wizard Lake**

Wells

Completed	36
Ultimate Total (est.)	52
Acres/well	40

Acreage

Developed	1,440 acres
Proved or Semi-proved	2,160 acres

Oil

Gravity API	38°
Sulfur	0.5%

Gas under-saturated

Production

Average Depth	6,000'
Producing Formation	D-3
Initial B.H.P.	2270 psig.
Present B.H.P.	2205 psig.
Gas Oil Ratio	485 cf/bbl.
Bbls./day	525 MPR Per Well

Reservoir

Average Net Pay	324'
Weighted Average Effective Porosity	8.6%
Average Permeability	800 md.
Average Connate Water, % of Porosity	13%
Estimated Shrinkage Factor	0.757

Reserves

Estimated Oil in Place (bbls.)	307,510,000
Recovery Factor	50%
Recoverable Oil—bbls/acre foot	219.7
Recoverable Oil—bbls/acre	71,183
Estimated Recoverable Oil, bbls.	153,755,000
Less Produced Oil, bbls.	1,887,000
Net Recoverable Oil, bbls.	151,868,000

Date: January 1953 **Field: Bonnie Glen D-3**

Wells

Completed	29
Ultimate Total (est.)	92
Acres/well	40

Acreage

Developed	1,120 acres
Proved and/or Semi-proved	3,600 acres

Oil

Gravity API	35.43°
Sulfur	0.1%

Gas 360' Gas Cap

Production

Average Depth	6,700'
Producing Formation	D-3
Initial B.H.P.	2500/psig.
Present B.H.P.	2498 psig.
Gas Oil Ratio	740 cf/bbl.
Bbls./day	775 MPR Per Well

Reservoir

Average Net Pay	239'
Weighted Average Effective Porosity	9.2%
Average Permeability	800 md.
Average Connate Water, % of Porosity	13%
Estimated Shrinkage Factor	0.664

Reserves

Estimated Oil in Place (bbls.)	354,830,000
Recovery Factor	50%
Recoverable Oil—bbls/acre foot	206.2
Recoverable Oil—bbls/acre	49,282
Estimated Recoverable Oil, bbls.	177,415,000
Less Produced Oil, bbls.	743,000
Net Recoverable Oil, bbls.	176,672,000

Coleville (Saskatchewan)

Royalite Oil Co. discovered 12 to 14 degree API crude oil in the Banff Sandstone of Mississippian age in September of 1951 in the Coleville area of western Saskatchewan. Development of the field progressed rapidly for a time and then tapered off due to market conditions. In July of 1952, Albercan Oil Corporation discovered either an extension or a new pool at Buffalo Coulee a few miles northwest of Coleville. Subsequent stepouts and development wells have delineated an area with proved and semi-proved reserves of eight million barrels. (See Figure 11).

In Coleville the Banff sand has an average porosity of 27 percent and an average net oil pay of 19 feet. The oil has a gravity of 13.6 degrees API with an average sulfur content of 3.6 percent. Reservoir energy is derived from a probable water drive and an expanding gas cap in the northeast part of the field. Initial bottom hole pressure was 910 psig. The following are the factors used in estimating the reserves of the Coleville Field:

Acreage (proved and semi-proved)	4,280 acres
Average Net Pay Thickness	19 feet
Recoverable oil, bbls/acre-foot	477.6
Recoverable oil, barrels	38,837,000
Less produced oil, barrels	288,000
Net Recoverable oil, barrels	38,549,000

Cantaur and Fosterton (Saskatchewan)

The first major discovery of medium gravity oil in Saskatchewan was made by Socony-Vacuum at Fosterton in Jan-

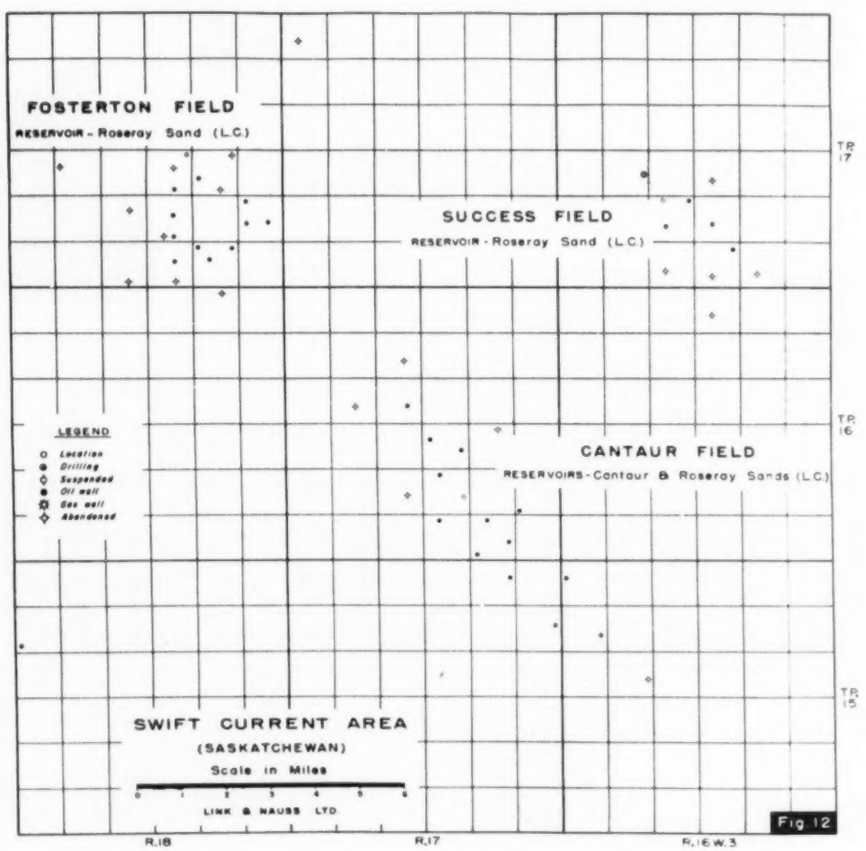

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TABLE III

SUMMARY OF MINOR POOLS IN ALBERTA DISCOVERED 1947-1952

Year	Pool or Field	Discovered	Reservoir	Average Thickness Net Pay	Initial Production B.O.P.D.	Order of Recoverable Reserves	Oil Gravity (API)
1947	Bantry	Dec.	L. C. Sand	7'	145	200,000(e)	24.9°
1948	Gilbert	July	L. C. Sand	17'	100±	2,800,000(c)	39.8°
	Baxter Lake	Aug.	L. C. Sand	9'	50-100	1,000,000(e)	18°
1949	Bon Accord	March	D-2	16'	239	1,800,000(c)	35°
	Whitemud	April	L. C. Sand	8'	235	300,000(c)	35°
	Campbell	June	L. C. Sand	10'	50	3,600,000(c)	33°
	Stettler	June	D-3	24'	1,000+	4,000,000(c)	27.4°
	Stettler	July	L. C. Sand	10'	50±	200,000(e)	26°
	Normandville	Sept.	D-3	25'	1,880	1,000,000(e)	37.5°
	Golden Spike	Nov.	D-2	60'	flowed oil (DST)	3,700,000(c)	38°
	Excelsior	Nov.	D-2	83'	1,000+	18,000,000(c)	35.1°
1950	Spring Coulee	March	Madison	—	40	200,000(e)	35-37°
	Whitelaw	Aug.	Triassic	45'±	50-100	1,000,000(e)	26.3°
	Duhamel	Sept.	D-2	40'	800 (DST)	4,300,000(c)	34°
			D-3	65'	1,110	5,500,000(c)	34°
	Acheson	Oct.	L. C. Sand	10'	50-100	2,000,000(e)	35-38°
	Ellerslie	Nov.	L. C. Sand	10'	240	1,000,000(c)	30°
	Barons	Nov.	Fish Scale Sand of Cret.	8'	60	500,000(e)*	32.6°
	Big Valley	Dec.	D-2	35'	2,000+ (on DST)	15,100,000(c)	32°
			D-3	15'	974	600,000(c)	32.1°
1951	Acheson	Jan.	D-2	68'	100-300	1,500,000(c)	37-38°
	N. Woodbend	Feb.	L. C. Sand	18'	100±	2,600,000(c)	39°
	Armisie	April	L. C. Sand	10'	100	1,500,000(e)	38°
	Wizard Lake	May	L. C. Sand	8'	flowed oil (DST)	500,000(e)	34°
			D-2	20'±	No I.P.	2,000,000(e)	—
	Namao	June	L. C. Sand	15'	50-100	5,000,000(c)	33°
	Drumheller	July	D-2	31'	1,000+	5,000,000(c)	32.5°
	Bashaw	July	D-3	9'	1,200	2,000,000(e)	38-41°
	Alliance	July	L. C. Sand	14'	168	500,000(e)	19°
	Bonnyville	July	L. C. Sand	10'	50±	3,500,000(c)*	10-18°
	West Devon	Aug.	L. C. Sand	14'	50	700,000(c)	35°
	Glenevis	Aug.	Madison Ls.	24'	96	1,000,000(e)	18°
	Glen Park	Sept.	D-2	23'	100	100,000(c)	38°
			D-3	140'	1,000+	8,000,000(c)*	38.5°
	Fenn	Sept.	D-3	15'	50-100	500,000(c)*	22.7°
	Belloy	Sept.	Permo-Penn	13'±	78	100,000(e)	28°
	New Norway	Sept.	D-2	60'	1,560	6,000,000(c)	38°
			D-3	36'	215	500,000(c)	33.7°
	Clive	Sept.	D-2	15'	237	1,000,000(e)	39°
	Chamberlain	Dec.	L. C. Sand	10'	35	500,000(e)	27°
1952	Malmo	Jan.	D-2	50'	1,000	5,500,000(c)	39°
			D-3	45'	3,500	4,500,000(c)	37°
	Skaro	Jan.	Cooking Lake	14'	120	500,000(e)	36°
	Legal	Feb.	Viking	9'	144	1,000,000(e)*	31.3°
	Lac St. Anne	Feb.	D-1	35'±	75	500,000(e)	23°
	Twining	Feb.	Madison	10'	32	200,000(e)	29°
	St. Albert	June	L. C. Sand	8'	50	500,000(e)*	36°
	Malmo	June	L. C. Sand	10'	1,000+ (DST)	1,000,000(c)	38-40°
	Clive	June	D-3	15'	825 (DST)	500,000(e)	40°
	Rosenheim	July	L. C. Sand	10'±	120	200,000(e)	12-13°
	Chauvin	July	L. C. Sand	15'±	50-100	2,500,000(e)*	22°
	South Nevis	July	D-2	24'	240	1,000,000(e)*	38.4°
	Sturgeon Lake	Aug.	D-3	90'	700	5,000,000(e)*	36°
	Pigeon Lake	Aug.	D-3	15-30'	—	2,000,000(e)	40°
	N. Big Valley	Aug.	D-3	10'	—	500,000(e)	18.3°
	Edgerton	Sept.	L. C. Sand	13'	—	200,000(e)	15.9°
	Chancellor	Sept.	L. C. Sand	13'	60-100	500,000(e)	32°
	W. Drumheller	Sept.	D-2	40'	732	6,000,000(c)*	40°
	Fiveland	Sept.	D-3	150'±	1,014	16,000,000(e)*	40.5°
	Hamilton Lake	Oct.	Viking	7'	288	1,000,000(e)*	34.4°
	Cessford	Nov.	Basal Col.	8'	100±	5,000,000(c)*	25.9°
	Jenner	Dec.	L. C. Sand	30'±	70-80	1,000,000(e)	17-18°
	Erskine	Dec.	D-3	35'	200	5,000,000(e)*	28°
	Neerlandia	Dec.	Viking	15'	—	500,000(e)*	29°
	West Viking	Dec.	D-1	20'	400 (swab)	500,000(e)	34.6°
	St. Albert	Dec.	D-2	20'	360 (DST)	1,000,000(e)	35°
			D-3	70'	1,328	5,000,000(e)*	35°
					Total	176,400,000	

See Table IV on page 66 for key to abbreviations

uary of 1952. Socony repeated its success in Cantaur and Success later in the year. Of the three fields, Cantaur is the largest with an estimated recoverable reserve of 114,000,000 barrels of crude oil. However, in contrast to the Fosterton and Success 23° API crude, the oil has an average gravity of 13° to 14° A.P.I. Two sands, the Roseray and the overlying Cantaur, with an estimated combined average thickness of 60 feet, are the reservoirs for the Cantaur Field. Very little reservoir or production data are available and the following assumptions were made to estimate the recoverable reserves of the Cantaur Field:

Acreage (proved and semi-proved)	4,560 acres
Est. Average Net Pay (two sands)	60 feet
Recoverable oil, bbls/acre-foot	418
Recoverable oil, barrels	114,000,000 (nearest million)

The Roseray sand is the only reservoir in the Fosterton area and has an estimated average net pay of 45 feet. The recoverable reserves were estimated using the following assumptions:

Acreage (proved and semi-proved	2,120 acres
Estimated Average Net Pay	45 feet
Recoverable oil, bbls/acre-foot	418
Recoverable oil, barrels	40,000,000 (nearest million)

The Success Field just east of Fosterton has an estimated recoverable reserve of 9,550,000 barrels of stock tank oil. The reservoir is again the Roseray sand with an estimated average thickness of 20 feet. The proved and semi-proved acreage is estimated to be 1,520 acres.

The Swift Current area of Saskatchewan in which these fields are located will probably contribute many times the reserves present in these three fields. In addition to the Roseray and Cantaur sands, the sandstones and limestones of the Jurassic and the limestones of the Mississippian constitute reservoirs with a high potential. (See Figure 12).

Minor Fields

Some of the fields which have been classified in this report as minor fields have only recently been discovered and their areal extent is unknown. For that reason they have been assigned an estimated recoverable reserve instead of a calculated reserve figure. Other minor fields have been almost completely developed and have been given calculated reserves. Again, other minor fields are situated on trends which in aggregate constitute a major reserve.

The Duhamel — New Norway — Malmo trend (see Figure 13, page 122, May) is still in the process of development. Up to January of 1953, three fields have been developed which have a total recoverable reserve of 27,300,000 barrels. Of the three fields, Malmo is the largest with a recoverable reserve of 11,000,000 barrels from the Ellerslie of Cretaceous age, and D-2 and D-3 members of Upper Devonian age. This field was discovered by Scurry Oils Limited and Central Explorers Limited in January of 1952 after the trend had been outlined by the Duhamel and New Norway fields, and the Waterglen water well which found D-3 reef development.

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The first discovery in the Williston Basin in either Canada or the U.S.A. was made in Manitoba by California Standard Co. in February of 1951. This Virden Field is currently producing slightly more than 1,000 barrels per day of 35 degree API oil from 29 wells. The reservoir for the field as well as for all subsequent Manitoba strikes is the Madison equivalent of Mississippian age. The other discoveries which followed Virden were all made in 1952. So far no indications of a major oil field have been found in Manitoba. However, very little exploration work has been done in comparison to Alberta, and the probabilities point toward substantial reserves for Manitoba.

In Alberta the small pools which have been discovered in 1952 and which will probably result in major oil fields are: Fiveland, Sturgeon Lake and possibly Erskine and St. Albert. All of these are discoveries of oil in the D-3 reef member of Upper Devonian age. Sturgeon Lake was discovered by Amerada in August of 1952 and is of particular interest because of its geographical position. It is the first discovery of Devonian oil in the Peace River since Imperial Oil Limited discovered Normandville in 1949. It has re-activated the whole area and will probably be the forerunner of many other oil fields of a similar nature.

In Saskatchewan the discoveries of 1952 have been developed to some extent, but with the exception of Fosterton and Cantaur they do not indicate major reserves. However, fields like Wapella will probably increase their reserves considerably.

Practically the entire sedimentary basin of northeastern British Columbia is now under lease by major and independent companies. Exploration has so far been confined mainly to surface geological surveying, some geophysical surveying and a very few deep tests. The only oil show of significance was found by Pacific Petroleums and associates in the Fort St. John area, and initiated a land rush. The oil was found in the sediments of Permo-Pennsylvania (or Mississippian) age. Since then the Fort St. John area has been developed as a major gas field and only a few deep tests have been drilled elsewhere. However, there are many excellent reservoir rocks in the stratigraphic sequence, particularly in the southeastern portion, and it is likely that major oil fields will be found in this province providing sufficient exploration is devoted to it.

Summary and General Observations

A graphic summary of the oil discoveries in Western Canada, beginning with the Leduc discovery in 1947 to January 1, 1953, is shown in Figures 2 and 3. (See Part I of this series, page 120 in May WORLD PETROLEUM.)

To date three major oil pool discoveries (i.e., 100 million barrels or more) have been made by Imperial Oil Limited. They are Leduc, Redwater and Golden Spike. McColl-Texaco has two major oil pool discoveries to its credit, namely Wizard Lake and Bonnie Glen. Canadian Gulf's Pincher Creek gas-distillate field is a huge gas reserve and may prove to be a major distillate pool, and that company has also made important discoveries at Stettler, Caprona, Holt and other places. Socony-Vacuum is responsible for the first discovery in Saskatchewan, namely Fosterton, which is the sixth major pool. This company also discovered the Duhamel-Flint trend, which fields combined should eventually produce more than 50 million barrels. California Standard's Acheson discovery uncovered more than 50 million barrels of reserves, and this company made the first Manitoba discovery at Virden, Manitoba. Thus it is obvious that the major oil companies have made, by far, the greatest number of and most prolific oil pool discoveries to date. If the Provincial Government of Alberta had not altered its reservation and lease regulations soon after the Leduc discovery, the independents would have fared even worse. Nevertheless, the role played by the independents in finding new oil pools is of great importance to the industry, and this fact is recognized by the well-informed and broad minded executives of the major oil companies.

There are no figures available as to the reserves from each field for the discoverer, but Imperial Oil Limited leads all of them by far. Via the "farmout" route to independents, Imperial Oil Limited has accumulated additional reserves in Joseph Lake, Leduc and elsewhere. Credit for these discoveries and extensions should go to those independents who consummated the deals.

The Malmo discovery proved to be a pool of slightly more than ten million barrels, but the discoverer does not control the major part of the productive area. The Provincial Government controls much prospective oil and gas acreage in this area and the greater part of it was put up for auction and purchased by majors and other independents. Regardless of this, however, the discovery does indicate that independents can and will share in the oil and gas wealth of Alberta, that the residents of Alberta will do likewise, and that the lion's share will always go to those who have the most, for it is said, "to them that hath shall be given." In this instance it is the people of Alberta and the majors who "hath" the most.

The Future for Western Canada

The record of achievement for Western Canada since the Leduc discovery speaks for itself. The recent discoveries in Saskatchewan, Manitoba and North Dakota indicate the gradual enlargement of the area of discoveries from the Alberta Syncline into the Williston Basin, and soon the northwestern portion of the Alberta Syncline, lying in northeast British Columbia, may be added to crude oil territory. It is safe to expect, under the assumption that the present tempo of exploration is maintained, that a 5 billion barrel reserve figure could be reached within the next 5 to 7 years. This is almost a "must" in order to justify the enlargement of the Interprovincial Pipe Line and the construction of the Trans-Mountain Line to the coast, but in view of the vast area, the thick geological sections available, and the past record during the last six years, such is not an impossible task. The same applies to natural gas which is being discovered with the crude oil at about the same pace. In 1948 the natural gas reserves were slightly more than 3 trillion cubic feet and now they are considerably more than 10 trillion cubic feet.

TABLE IV

SUMMARY OF MINOR POOLS IN SASKATCHEWAN AND MANITOBA DISCOVERED 1947-1952

Year	Pool or Field	Discovered	Reservoir	Average Thickness Net Pay	Initial Production B.O.P.D.	Order of Recoverable Reserves	Oil Gravity (API)
1951	Virden	Feb.	Miss. Ls.	30-100'	30-100	2,500,000(e)	35°
1952	Hoosier	May	L. C. Sand	30'	100	2,000,000(e)*	15°
	Midway	June	Jurassic sand	15'	200	1,000,000(e)	22°
	Eastend	June	Jurassic sand & Ls.	80'	800	1,000,000(e)	22-23°
	Ratcliffe	June	Miss. Ls.	20'±	130	100,000(e)*	31°
	Buffalo Coulee	July	Miss. (Banff) sand	13'	100±	8,000,000(c)*	12-14°
	Success	Aug.	L. C. Sand	20'	200-300	9,500,000(c)	22°
	Wapella	Oct.	L. C. & Jurassic sands	20'	100	5,000,000(e)*	26-27°
	Gull Lake	Dec.	Jurassic Ls. and sand	40'	150	1,000,000(e)*	23°
					Total	30,100,000	

Explanation of abbreviations:
(c)—calculated
(e)—estimated
*—fields which could be larger or much larger
L. C.—Lower Cretaceous
Permo-Penn—Permian-Pennsylvanian

IHC Training Center in Morocco

A training center for instruction in the maintenance, repair and overhaul of International Harvester crawler tractors and engines, plus the matched allied equipment that works with this power, is now completing seven months operation at Casablanca, Morocco. Fifty-five service managers and potential managerial personnel from Europe, the Middle East and Africa have attended the five six-week sessions carried on there by the International Harvester Export Company, with a limit of 12 men to a class. Trainees came from 23 countries, from Sweden to South Africa, to attend this program. In addition there were men from two large construction firms that are building Moroccan air bases for the U. S. Air Force.

Engineering School

The School of Petroleum Engineering in the University of Zulia, Venezuela, now in its first year, will be headed by Prof. E. E. Barbieri of Tulsa, who organized the School of Civil Engineering in the same institution several years ago. A new building is expected to be completed by May 1954. A representative of the school has recently been in the United States to engage North Americans to teach on the faculty and to get ideas on the procedures used in other schools located, like Zulia, in a producing area.

Pipe Line Tariffs Published

A table of tariffs charged by Mene Grande for moving the oil of other companies through the pipe lines which it operates and owns jointly with Creole and Sinclair in Venezuela has been published in the Official Gazette. It provides for a minimum tariff through the Oficina trunkline of Bolivares 2.40 (72c) per cubic meter, to a maximum of Bs. 3.15 (94c), depending on distance from the tanks at Puerto la Cruz. Minimum tender is 10,000 barrels. Loading and storage charges also were fixed.

Increases Venezuela Tonnage

Shell Caribbean has put the 8,500-ton "Gardinia," a tanker now flying the Dutch flag, under Venezuela registry. This is the fifth of its class to be transferred by Shell. Older units in the Shell Venezuelan fleet are being replaced to increase per-ship tonnage and speed of the fleet. The company is increasing its total tonnage by 70,000, or 50 percent over 1952.

Willard M. Hall

Willard M. Hall, former director and member of the management committee of the Creole Petroleum Corp., died at Winter Park, Florida, on April 8. Mr. Hall was 56. He was associated with the Creole company and other affiliates of the Standard Oil Co. (N.J.) for more than thirty years. He retired in May 1951.

Book Review

Wavefront Charts and Raypath Plotters, by Dr. Albert W. Musgrave, seismic party chief for the Magnolia Petroleum Company in Monahans, Texas, is a 60-page publication which includes 24 figures, four charts, three tables and five large plates. It sells for $1 and may be ordered from the department of publications at the Colorado School of Mines, Golden, Colo.

Dr. Musgrave designed the Musgrave Raypath Plotter, an electrochemical device for computing and drawing commercially accurate wavefront charts, while working on his doctor of science degree at "Mines." The machine is operated by the Colorado School of Mines Research Foundation, Inc. in drawing wavefront charts for commercial oil and exploration companies.

Dr. Musgrave's book is concerned principally with the use of wavefront charts, construction of raypath plotters, and mathematical developments leading to the making of wavefront charts for the assumption of the linear increase of velocity with vertical time.

Excess Italian Capacity

At a recent meeting of the Italian Association of Petroleum Trade the discussion centered on the sharp increase in Italian refining capacity not balanced by a corresponding increase in demand for finished products.

Italian capacity, with the starting of operations in new refineries (such as SARPOM, Condor, SAROM, and others of less importance), and with the increase of capacity in almost all existing plants, will reach at the end of the current year the record level of 17,000,000 metric tons/year (120,000,000 barrels/year). This figure compares with the 1953 internal consumption, calculated by the Ministry of Industry and Commerce, of about 6,000,000 metric tons.

The excess capacity of about 11,000,000 tons presents a problem which cannot easily be solved, bearing in mind that during 1952, in a particularly favorable situation, Italian export of products was far below 3,000,000 metric tons.

Venezuela Exploration Activity

Exploration activity was 25 percent higher in 1952 in Venezuela than in 1951, with a total of 492 party-months as compared with 408. Shell was first among the nine companies operating field parties with 153 party-months, followed by Creole with 96; Richmond, 52; Mene Grande, 51; Socony, 45; Phillips, 36; Texas-Mercedes, 30; Venezuelan Atlantic, 17; and Sinclair, 12. Among the areas of most intensive activity were the Apure-Barinas region, with 98 party-months; the state of Falcon, with 74; the mountain states, 72; Anzoategui, 65; and Zulia, 55. Guarico, where the principal operators are Varco and Texas Mercedes, accounted for 37 party-months; Monagas, where Creole is the main operator, for 53.

In March this year 41 geological-geophysical parties were operating, as compared with 44 a year ago. These included 18 seismograph parties, 19 geological, 3 gravimeter and 1 structure drill.

Substantial Gasoline Savings

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This Wiggins "Dryseal" Vapor-Balancing Gasholder, located at a new refinery at Edmonton, Alberta, has a capacity of 200,000 cubic feet and is 74'6" in diameter with a height of 48'0". It is coupled to 22 storage tanks with large diameter piping, to form a complete system, to prevent substantial losses from standing storage "breathing" and in-and-out pumping and blending.

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Location	Capacity	Duty
WIGGINS "DRYSEAL" GASHOLDER		
Edmonton	200,000 cu. ft.	Refinery Gasoline Conservation
Windsor	60,000 cu. ft.	Marketing Terminal
WIGGINS "DRYSEAL" LIFTER-ROOF TANKS		
Chatham, N.B.	54,390 Bbls.	Conservation and Storage
Toronto	34,000 Bbls.	Conservation and Storage
WIGGINS GASHOLDER		
London	5,000 cu. ft.	Oxygen Storage
Toronto	5,000 cu. ft.	Oxygen Storage
Hamilton	2,500 cu. ft.	Oxygen Storage
Hamilton	1,500 cu. ft.	Oxygen Storage
Sarnia	40,000 cu. ft.	Hydrogen Storage
Maitland	20,000 cu. ft.	Nitrogen Storage
Montreal	1,500 cu. ft.	Oxygen Storage
Shawinigan Falls	150,000 cu. ft.	Acetylene Storage
Hamilton	250,000 cu. ft.	Coke Oven Gas Storage
Edmonton	20,000 cu. ft.	Hydrogen Storage
WIGGINS LODEK FLOATING TANKS		
Sarnia	2-150 ft. dia. x 48 ft.	Conservation and Sour Crude Oil Storage

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OIL COMPANY STAFF CHANGES

ROY J. TIBBETS has been appointed chairman of the board of Sinclair Pipe Line Co. William H. Morris was named president to succeed Mr. Tibbets; Robert C. Beardon, formerly a vice president, was named executive vice president and director; and Gerald M. Johnson vice president and director in charge of crude lines.

Completion of five more major crude and products lines projects, either wholly or partly owned by Sinclair, is anticipated in 1953. Construction work on two of the projects is complete. These are the Rancho crude line from west Texas to Houston, in which Sinclair has a part interest, and the Sinclair Big Inch from Cushing, Okla., to the Chicago refining areas.

Scheduled for 1953 completion are: the part interest in Evangeline products line from Port Arthur, Texas, to Baton Rouge, La.; Sinclair's connecting products line from Houston to Port Arthur, Texas, and the Harbor system, a products line in which Sinclair has a part interest and which is now being built to connect the Philadelphia refining area with the Greater New York market.

LOREN D. GRUBB, assistant superintendent of Continental Oil Company's refinery at Ponca City, Okla., has been selected as one of over 30 young men from American industry to receive a 1953-54 Sloan Fellowship at Massachusetts Institute of Technology, Cambridge, Mass. Established by Alfred P. Sloan Foundation, Inc., the Sloan Fellowship Program for Executive Development was founded in 1938 to train promising young technical executives in the broader phases of industrial management and to prepare them for future positions of business leadership. The course extends from June of this year to June 1954.

DR. HAROLD T. BYCK has been appointed assistant for production research to the president of Shell Development Company. A veteran of 17 years in various research positions in the Shell organization, Dr. Byck will be responsible in his new post for liaison between the head office of Shell Development here and the experimental projects conducted at the company's Exploration and Production Research Laboratory at Houston, Texas.

Dr. Byck is chairman-elect of the Colloid Division of the American Chemical Society. Because of his move to New York, he is resigning his office as chairman of the Southeastern Texas Section of the society.

A. W. TARKINGTON, Oklahoma City, vice president and central region general manager of Continental Oil Co., has been appointed southwestern region general manager with headquarters at Fort Worth, Texas. He succeeds H. H. Hinson, Houston, who recently was elected vice president in charge of exploration.

K. W. Brill, Houston, assistant general manager of Conoco's southern region, succeeds Mr. Tarkington at Oklahoma City.

C. R. McPHERSON, manager of Sovereign Service Inc., Wichita, the largest independent marketing organization in the oil industry, has resigned to become advertising and sales promotion manager of the Vickers Petroleum Co., Inc., Wichita, Kansas.

CARL L. RITTER, Houston, has been promoted from assistant director to director of Continental Oil Company's natural gasoline and gas division. He will continue to make his headquarters in Houston. He succeeds J. R. Bailey, who has resigned to join Mene Grande Oil Company in Venezuela.

WILLIAM N. HOLT has been named manager of foreign operations, eastern hemisphere, of The Texas Co., according to A. N. Lilley, Texaco vice president in charge. Mr. Holt was formerly managing director of Caltex (Ireland) Ltd., an affiliate of Regent Oil Co. Ltd., a British company jointly owned by California Texas Oil Co. Ltd. and Trinidad Leaseholds, Ltd.

He joined the Texas company in 1937 and was in domestic sales at Norfolk, Va., until 1942. From 1942 to 1946 he was in the foreign sales division in Latin America, and in 1946 and 1947 he was in the foreign sales division, European. He joined Caltex in 1947.

DREW L. HINES, vice president, became eastern operating head of the Tide Water Associated Oil Company May 1. He assumed the duties of chairman of the eastern division operating committee and head of the administrative department. He succeeds B. I. Graves, who held that position since 1940 and who retired. Mr. Hines has been serving as vice-chairman of the operating committee and is a member of the company-wide co-ordinating committee.

Mr. Hines has been with Tide Water Associated and its predecessor, the Associated Oil Company, since 1922, when he joined the San Francisco office as a construction foreman. After service in California, Washington, and the Philippine Islands, he became chief engineer of the pipe line department, and later assistant manager of transportation, western division. In 1944 he was transferred to the eastern division as manager of the transportation and supply department at New York. He became vice president in charge of that department later that same year.

J. J. MULVEY, manager of domestic fuel oil marketing for The Atlantic Refining Co. since 1924, retired April 30 after a career of 41 years with the company. He was succeeded by W. S. Shockley, special merchandising assistant.

Mr. Mulvey joined Atlantic in 1912 and was assigned to the office of the late J. W. VanDyke, then president. He was transferred to domestic marketing in gasoline sales in 1914, and two years later he began his service in fuel oil sales.

H. H. HINSON, Fort Worth, Texas, general manager of Continental Oil Company's southwestern region, has been elected vice president in charge of exploration. He will make his headquarters in Houston. He succeeds Ira H. Cram, who recently was named a senior vice president of Continental.

Mr. Hinson joined Conoco in 1948 as chief production research engineer at Ponca City, Okla. He became assistant manager of the production department, with headquarters at Houston, two years later. He was promoted in 1952 to southwestern region general manager for Conoco, with headquarters at Fort Worth.

DR. W. J. McGILL, general manager of industrial and public relations of Standard Oil Co. (Ind.), will be proposed for election as a new director of the company at the annual meeting of stockholders May 7. Dr. McGill joined Standard in 1924 as a chemist at its Whiting, Ind., refinery. Four years later he was transferred to the Wood River, Ill., refinery, where he was promoted to refinery manager in 1942. He returned to the Whiting refinery as manager in 1946.

In 1948 Dr. McGill was advanced to superintendent of manufacturing operations in the company's general office at Chicago. He became assistant general manager of manufacturing in 1951 and general manager of industrial and public relations in 1952.

W. N. Holt

D. L. Hines

J. J. Mulvey

Dr. W. J. McGill

Standard Oil Company (New Jersey) reports on...

A big job...well in hand

(Highlights from the Annual Report for 1952)

PEOPLE needed more oil in 1952 than ever before, but once again ample supplies were available to meet the demand. An important part of this big job was done by companies in which Standard Oil Company (New Jersey) has investments. These companies expanded their facilities to provide people of many nations with oil to heat and light their homes, fuel their ships and planes and trains, power and lubricate their factories, harvest their crops, and run their cars and trucks.

Jersey's Annual Report for 1952 shows how the big job of supplying people's oil needs has become even bigger. It shows, too, how well this kind of American enterprise handles it.

During 1952, Jersey's affiliated companies produced, refined and sold more oil than in any previous year. This meant more oil wells, more miles of pipe line, new tankers, additional refining capacity, and expanded distribution facilities.

It also meant large investments. During the year, new equipment and replacements cost $498,000,000. Since 1945, *almost three billion dollars* have been spent for this purpose.

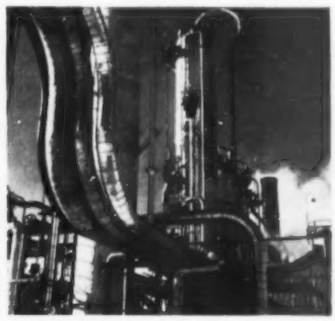
The increased business brought to Jersey and its consolidated affiliates a record gross income for the year, but because of the higher costs of doing business, *net* income was $8,480,000 less than 1951's record high. About half of this net income of $520,000,000 was paid in dividends to the 269,000 persons who own Jersey.

These pictures give some idea of the scope and scale of Jersey affiliates' activities during 1952:

New Oil is located by constant search. Here geologists in Canada explore regions so isolated that supply must be by air. New fields were also sought, with success, in the U. S., South America, Western Europe, the Middle and Far East.

When Geologists Find a Likely Spot, or when producing fields are being developed, new oil wells must be sunk, often at great cost. Here is a big drilling rig in a project which, in 1952, greatly expanded the known boundaries of an oil field in Saudi Arabia.

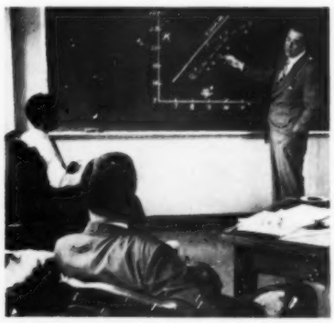
Many New Producing Wells, such as this one opening a field in Texas, must be placed in operation yearly to meet mounting demands. In 1952, total production of Jersey affiliates was 4 times that of 20 years ago. Despite the great use of oil, proved reserves were at an all time high.



New Refining Capacity helps to meet the need for more and better products. The units shown above represented part of a recent modernization and expansion program at a Jersey affiliate's refinery. During the last 20 years refinery runs of Jersey's affiliates have tripled.

Pipe Lines are costly to install, but in the long run provide the most efficient overland transportation of petroleum. This means cheaper, more abundant fuels and lubricants. The 26-inch pipe shown above went into the construction of a line delivering crude oil to a Venezuelan refinery.

Tanker Construction goes on constantly to meet requirements for water transportation of crude oil and finished products. During 1952 Jersey affiliates took delivery of two new ocean-going tankers like the one shown above, as well as four smaller tankers. Twenty others were either under construction or on order.



New Ideas are essential to meet people's needs for more and better oil products. Over $27,000,000 and the time of 2,500 employees were devoted to research in 1952. Notable results included a lubricant which will permit important developments in jet aircraft engines and a motor oil to maintain efficiency of new car engines.

FINANCIAL SUMMARY—1952

Standard Oil Company (New Jersey) and Consolidated Affiliates

Total income from sales, services, dividends and interest	$4,156,977,000
Net income	$519,981,000
or $8.58 per share	
Dividends paid	$256,882,000
or $4.25 per share	
Wages and other employment costs	$670,200,000
Taxes charged to income	$371,600,000
Other taxes, collected for governments	$384,500,000
Spent for new plants and facilities	$498,051,000
Number of shareholder-owners	269,000
Number of employees	120,000

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STANDARD OIL COMPANY (NEW JERSEY)
AND AFFILIATED COMPANIES

ESSO

B. F. Curtis

C. N. Page

D. E. Buchanan

BEN F. CURTIS has been appointed chief geologist for Texas Eastern Production Corp. He formerly was division geologist in charge of the company's Shreveport division. Before coming to Texas Eastern, Mr. Curtis was employed by Skelly Oil Co. as assistant district geologist, and prior to that was district geologist for Kerr-McGee Oil Industries.

J. FRANK DRAKE, chairman of Gulf Oil Corp. for the past five years and president for the previous 17 years, was named chairman of the executive committee at the recent annual meeting. He will take a less active role in the company.

Sidney A. Swensrud, president since 1948, was named chairman of the board and chief executive officer. He is succeeded as president by William K. Whiteford, formerly executive vice president.

F. C. W. Paton was named vice president in charge of foreign marketing. He had been general manager of foreign marketing since last August, following the death of W. A. Berryman, to whom he had been assistant.

Mr. Drake's first connection with Gulf was following his military service in World War I. He was away from Gulf for several years in management functions with other Mellon companies and returned as president in 1931. Mr. Swensrud came to Gulf in 1947 from Standard Oil Co. of Ohio which he had served as executive vice president. He succeeded Mr. Drake as president the following year.

Mr. Whiteford resigned as chairman of British American Oil Co. to join the Gulf executive family in 1951. He had been an oil man since the twenties, when he was a worker in southern California fields. Later he joined Barnsdall Oil Co. and rose to vice president and production manager in the mid-continent. He joined B-A in 1934 at Tulsa.

C. NEWTON PAGE has recently resigned as seismologist for the Honolulu Oil Corp., Midland, Texas, to become associated with the Continental Geophysical Co. of Fort Worth. Mr. Page will supervise the company's operations in West Texas and New Mexico. He will continue to reside in Midland.

W. G. ANGEL has been promoted to assistant to K. W. Rugh, manager of the public relations department of Phillips Petroleum Company. R. E. Jeffrey, editorial director, is now in charge of all writing handled by the company's public relations department. Fred J. Pralle, formerly publicity director, has resigned to enter business for himself.

R. M. SMITH, Los Angeles, Calif., assistant to Continental Oil Company's western regional geologist, has been promoted to director of training for the company's production department, with headquarters in Houston. He succeeds R. B. Sale, who was recently promoted to director of executive development for Conoco.

JAY C. McWILLIAMS, Ville Platte, La., North Louisiana district production superintendent for Continental Oil Co., has been appointed East Texas district production superintendent. He succeeds A. A. Anders, who was recently promoted to West Texas-New Mexico division production superintendent and transferred to Conoco offices at Midland, Texas.

ROBERT F. MATTHEWS has been promoted to assistant division geologist for Continental Oil Co. with headquarters at Midland, Texas. He succeeds C. S. Killgore, who has been promoted to division geologist at New Orleans, La.

D. E. BUCHANAN, president of Hiwan Oil & Gas Co., Houston, was presented with the Hanlon Award at the recent annual meeting of the Natural Gasoline Association of America. Mr. Buchanan entered the natural gasoline industry in 1918. He sold the first cargo for export in 1926 and has been active for many years in the development of new markets for light hydrocarbons.

T. C. STAUFFER has been appointed to the newly created post of administrative assistant, production department of Sun Oil Co. He moved to the general office in Philadelphia from Evansville, Ind., where he has been manager of Sun's central production division since 1941. E. J. Reading, who has been manager of the land department, succeeds Mr. Stauffer in Evansville and James A. Veasey, Jr., has been named land department manager.

EMMETT L. COLVIN has been appointed assistant division manager of Texas Eastern Transmission Corporation's division one, of which L. D. Whitehead is division manager. He was formerly division engineer and replaces Robert S. Cooper, who has been transferred to Dallas as superintendent of pipe lines and compressor stations for Wilcox Trend Gathering System, Inc.

CYRUS S. KILLGORE has been promoted to division geologist with headquarters in Continental Oil Company's newly created geological division offices at New Orleans, La. Mr. Killgore has been with Continental for the past six years, most recently as assistant division geologist at Midland, Texas.

J. F. Drake

W. K. Whiteford

S. A. Swensrud

F. C. W. Paton

The chemistry of PROGRESS—

Juggling the world's smallest components—atoms and elements—demands the services of some of the world's largest, strongest and most complicated equipment. The petroleum, petrochemical, chemical and atomic energy industries have marched forward in seven-league boots because gigantic plants like Sun Ship have been able to make the "boots." . . . They have kept pace with the engineering needs of the industries . . . have been able to place in the scientist's hands the "tools" which enable him to mold elements as old as the world into products as new as today.

There has been what might be called a chemistry of progress at work in Sun Ship's mighty plant to match the progress of chemistry. The services of its great shops, the skills of its thousands of workers, have been adapted like atoms into new patterns which enable the great plant to make and fabricate the array of equipment . . . the engines and machinery . . . pressure vessels . . . fractionating towers . . . stills . . . tanks . . . catalytic cracking cases and other equipment which serve modern chemistry in building a greater America.

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BRITISH OIL NEWS

By E. Lawson Lomax

Results of refinery construction and additions to plants in Great Britain during the past two years are finding reflection in operating reports appearing at the present time. Processing plants of Anglo-Iranian Oil Company Ltd. in the United Kingdom, as shown by recently published figures, increased their throughput from 5,332,000 tons in 1951 to 6,788,000 tons in 1952, a gain of roundly 1,500,000 tons. This increase represents the rise only in the three refineries at Llandarcy, Grangemouth and Pumpherston.

Since the first of the current year, production has begun at Kent refinery, and up to the middle of March more than 60,000 tons of products had been despatched abroad to markets in the Mediterranean, the Middle East, Africa and northern Europe.

The first commercial unit for operation of the Autofining process developed by Anglo-Iranian has now been running in the Llandarcy refinery for over six months with highly satisfactory results. It has an input capacity of 3,500 b/sd and operates at pressures varying from 50-300 psig, (according to the type of feed stock undergoing treatment) and at temperatures between 700-800° F. The catalyst used is regenerated *in situ* periodically, the on-stream period varying with the boiling range of the feed-stock.

A wide variety of feed stocks can be effectively desulfurized, varying from natural and straight run gasolines through naphthas and kerosines to gas oils and light diesel fuels, the sulfur removed being mainly converted to hydrogen sulfide. In addition to the formation of hydrogen sulfide, a small amount of excess gas consisting mainly of hydrogen is produced, which gas is re-cycled, no external hydrogen supply being required. In order to keep pressure constant, a portion of the excess gas is bled off to fuel where feed stocks low in sulfur are being treated, but where maximum desulfurization is required, the excess hydrogen is kept in circuit and none is removed except that dissolved in the liquid product which is separated in the stabilizer.

Another unit of 3,500 b/sd at Llandarcy which was commissioned in July 1952, has been operating mainly on naphtha for the production of white spirit and power kerosine (tractor vaporizing oil) in blocked operation. The installation represents an erected cost, within battery limits, of £250,000 ($700,000).

New Caltex Group Tanker

The tanker "S. S. Caltex Manchester" was launched April 29 at Hebburn-on-Tyne, England, it was announced by The Caltex Trading and Transport Co., Ltd., agents for Overseas Tankship (U.K.) Ltd. The 17,000-ton ship was the eighth ship to be launched in Overseas Tankship (U.K.) Limited's construction program. The ship is 544 feet in length, and is turbine gear powered to give her a trial speed estimated at 15 knots.

Shell's New Refinery in Australia

This refinery, which has now reached the half-construction stage, is being built on a 250-acre site about 5 miles north of Geelong, which in turn is about 36 miles from Melbourne. It is a modern plant, and when completed in mid-1954 will be the largest refinery in Australia. It will process crude from the Seria oilfield in British Borneo.

The annual output will be over one million tons of various petroleum products, of which about 225 million gallons per year will be pumped to Melbourne through an eight-inch pipe line, which will be welded, bitumen and glass fibre wrapped, and will have magnesium cathodic protection against corrosion. It will be Australia's largest pipe line, and is the first major project of this kind to be introduced into Australia, as it will be used for pumping two dissimilar refined oils in direct contact in the same line, avoiding mixture by careful pressure control.

The capacity of the line is 225 million gallons per year, but this can be raised to 600 million by the addition of an auxiliary pumping station. The steel for the pipe will be made in Australia and will cost £A500,000.

The total cost of the refinery will be £A9 million, and seven companies, two of them Dutch specialist concerns, are employed on the site. Werkspoor, one of the Dutch firms, is responsible for the erection of the processing plant.

Thirty-four storage tanks with a total capacity of over 200,000 tons are under construction, while the Geelong Harbour Trust plans to dredge the port approaches to a depth of 32 feet and to construct a special jetty to accommodate vessels up to the size of the 18,000 dwt general purpose tankers. Fifty of these tankers are now being built in British and Dutch shipyards for the Shell fleet.

Wulff Process for Acetylene

By extension of an existing agreement, Fluor Corp. Ltd., which is represented in the sterling area by Head Wrightson Processes Ltd., has made an arrangement with Wulff Process Co. under which Fluor is authorized to design and construct plant for the application of the Wulff process. The process uses natural gas, ethane, propane, butane or any other LPG mixture as feed stock and produces low cost acetylene.

Petrochemical Plant in France

A two million pound plant jointly owned by Shell and the Societe de Saint-Gobain commenced operation last November and was officially opened on January 29, 1953.

It is the first of its kind in France and is designed for a production of 7,500 tons of acetone and mixed solvents, enabling imports of these materials to be cut down with consequent saving in foreign exchange to the extent of about $700,000 per year.

Personnel

L. Soulal has been appointed to the post of manager of the Birkenhead works of Vacuum Oil Co. Ltd. in succession to the late E. R. Slater. The works comprise oil compounding and blending plants where Mobiloil and other high-grade lubricants, together with most of the company's grease products, are manufactured.

Mr. Soulal studied chemistry and engineering at the City and Guilds Engineering College, and subsequently gained extensive experience in the petroleum industry with London & Thames Haven Oil Wharves Ltd. He joined Vacuum in 1943, and became assistant works manager at Birkenhead in 1944.

He is succeeded as assistant manager by R. C. Hanower, who was educated at Edinburgh Academy. Mr. Hanower joined the Vacuum Oil Co. in 1947 and has served in several engineering capacities.

H. W. Barnett has been made manager of the newly formed oxygen generator division of the Butterley Co. Ltd. as well as acting as the company's London manager, the post he has previously held. A. A. C. Robertson will be chief engineer, while Dr. G. G. Haselden has been appointed consultant.

The company manufactures oxygen generating plants of varying capacities which are easily erected and run at places where external supplies are difficult owing to location or other reasons.

Keith Thomson has been appointed head of the publications section, public relations department of Esso Petroleum Co. Ltd. During the war he served with the 11th Armored Division and subsequently on General Eisenhower's intelligence staff. At the conclusion of hostilities he assumed direction of German broadcasting in the British Zone.

Engineer Rear-Admiral Sir Sydney Frew, R.N. (Ret.), has been appointed chief fuel engineer to the Ministry of Fuel & Power in succession to the late J. Price Walters.

Simon J. Vos, Chairman of Trinidad Leaseholds, Ltd., Regent Oil Co. Ltd., and a director of a number of other companies, has been appointed a governor of the City of London Society.

Sir George Erskine has been appointed a director of London & Thames Haven Oil Wharves to fill the vacancy caused by the recent death of Sir F. Vernon Thomson.

George Noble has been elected to the board of directors of the Esso Petroleum Co. Ltd. He was prominently connected with the building of the Fawley refinery, and took over its management in February 1951. In September 1952 he was made general manager of refining, supervising all manufacturing operations and personnel.

R. H. J. Ingle has been appointed operations manager of Scottish Oils and Shell-Mex Ltd. He joined the fuel department of Shell-Mex Ltd. in 1925. In 1939 he was seconded to the Admiralty for special duties.

In November 1946 he was appointed a senior assistant in the black oils department of the Petroleum Board and re-joined the fuel oil department on the reorganization of Shell-Mex & B. P. in July 1948. In April 1951 he was transferred to the development (now distribution) department and a year later was appointed assistant manager.

L. Soulal

H. W. Barnett

K. Thomson

G. Noble

R. H. J. Ingle

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World Tanker Fleet *(Continued from page 44)*

ANALYSIS OF TANKERS UNDER CONSTRUCTION IN SHIPYARDS OF THE WORLD DECEMBER 31, 1952

SHIPYARDS	NO. OF TANKERS BUILDING	DEAD WEIGHT TONS (Or Gross)	DIESEL	TURBINE	RECIPROCATING	NO.	BRITISH OWNERS D.W.T. (Or Gross)	NO.	FOREIGN OWNED D.W.T. (Or Gross)	NO.	OIL CO. D.W.T. (Or Gross)	NO.	INDEPENDENTS D.W.T. (Or Gross)
HOLLAND													
Scheepswerf En Machinefabriek "De Biesbosch", Dordrecht	1	2,200(G)	1	—	—	—	—	1	2,200(G)	—	—	1	2,200(G)
Bijker's N.V. "Ijsselwerf", Gorinchem	2	2,300(G)	2	—	—	—	—	2	2,300(G)	—	—	2	2,300(G)
N.V. Scheepswerven V/H H. H. Bodewes, Millingen	1	2,000(G)	1	—	—	—	—	1	2,000(G)	—	—	1	2,000(G)
C. Van Der Giessen & Zonen's Scheepswerven, N.V. Krimpen A/D Ijssel	7	95,550dwt 10,000(G)	4	2	1	2	26,000	5	69,550dwt 10,000(G)	4	62,650	3	32,900dwt 10,000(G)
Nederlandsche Dok En Scheepsbouw Maatschappij Amsterdam	25	588,350	7	18	—	6	134,000	19	454,350	6	134,000	19	454,350
Rotterdamsche Droogdok Mij. Rotterdam, & New Waterway Shipbuilding Co., Schiedam	8	138,000	—	7	1	—	—	8	138,000	7	118,000	1	20,000
Van P. Smit Jr. N.V., Rotterdam	6	99,500	3	3	—	—	—	6	99,500	3	54,000	3	45,500
Gebr. Van Der Werf, Deest, Nr. Nijmegen	2	4,500(G)	2	—	—	—	—	2	4,500(G)	—	—	2	4,500(G)
N.V. Kon. Mij. "De Schelde", Flushing	2	40,000	—	2	—	—	—	2	40,000	—	—	2	40,000
Werf Jan Smith CZN., N.V. Alblasserdam	1	16,000	1	—	—	—	—	1	16,000	—	—	1	16,000
Wilton-Fijenoord N.V. Schiedam	12	234,600	6	4 2*	—	5	90,000	7	144,600	6	122,000	6	112,600
TOTAL	67	1,212,000dwt 21,000(G)	27	36 2* turbo-elec.	2	13	250,000	54	962,000dwt 21,000(G)	26	490,650	41	731,350dwt 21,000(G)
ITALY													
Ansaldo S.A., Genova Sestri	4	107,100	3	1	—	—	—	4	107,100	—	—	4	107,100
Cantiere Di Muggiano, La Spezia	3	58,500	1	2	—	—	—	3	58,500	—	—	3	58,500
Cantiere Di Livorno	1	31,500	—	1	—	—	—	1	31,500	—	—	1	31,500
Cantiere Navale Felszigi, Trieste	1	1,500(G)	1	—	—	—	—	1	1,500(G)	—	—	1	1,500(G)
Cantieri Navali Riuniti Sp.A. Genoa Via Cipro II	3	57,000	—	3	—	—	—	3	57,000	—	—	3	57,000
Cantieri Navali Di Taranto	1	19,000	1	—	—	—	—	1	19,000	—	—	1	19,000
Cantieri Riuniti Dell Adriatico, Trieste & Malfalcone	8	188,700	5	3	—	—	—	8	188,700	1	18,800	7	196,900
Cantieri Del Tireno C.p.A., Genoa	1	10,000	—	1	—	—	—	1	10,000	—	—	1	10,000
TOTAL	22	471,800dwt 1,500(G)	11	11	—	—	—	22	471,800dwt 1,500(G)	1	18,800	21	453,000dwt 1,500(G)
JAPAN													
Harima Shipbuilding & Engrng. Co., Aioi, Hyogo	1	13,400(G)	—	1	—	—	—	1	13,400(G)	—	—	1	13,400(G)
Hitachi Shipbuilding & Engring. Co., Sakurajima Shipyard	1	12,500(G)	—	1	—	—	—	1	12,500(G)	—	—	1	12,500(G)
Hitachi Shipbuilding & Engring. Co., Innoshima Shipyard	2	25,000(G)	—	2	—	—	—	2	25,000(G)	—	—	2	25,000(G)
National Bulk Carriers, Inc., New York, Kure Shipyard	4	152,000(G)	—	4	—	—	—	4	152,000(G)	—	—	4	152,000(G)
Mitsubishi Nippon Heavy Industries Ltd., Yokohama	1	18,500	1	—	—	—	—	1	18,500	—	—	1	18,500
Mitsubishi Shipbuilding & Engrng. Co. Nagasaki Shipyard & Eng. Wks.	3	51,300(G)	—	3	—	—	—	3	51,300(G)	2	35,300(G)	1	16,000(G)
Nippon Steel Tube Co., Tsurumi Shipyard	3	39,000(G)	—	3	—	—	—	3	39,000(G)	—	—	3	39,000(G)
TOTAL	15	18,500dwt 293,200(G)	1	14	—	—	—	15	18,500dwt 293,200(G)	2	35,300(G)	13	18,500dwt 257,900(G)
NORWAY													
A/S Akers Mek. Verksted, Oslo	1	14,750	1	—	—	—	—	1	14,750	—	—	1	14,750
A/S Bergens Mekaniske Verksteder, Bergen	1	3,200(G)	1	—	—	—	—	1	3,200(G)	—	—	1	3,200(G)
A/S Framnaes Mek Verksted, Sandefjord	16	246,750	16	—	—	—	—	16	246,750	—	—	16	246,750
Marinens Hovedverft, Horten	4	70,000	4	—	—	—	—	4	70,000	—	—	4	70,000
Kaldnes Mek. Verdsted A/S Tonsberg	7	126,000	7	—	—	—	—	7	126,000	—	—	7	126,000
Kristiansands Mek. Verksted A/S Kristiansand	4	20,000(G)	4	—	—	—	—	4	20,000(G)	—	—	4	20,000(G)
A/S Rosenberg Mek Verksted, Stavanger	9	240,200dwt 10,500(G)	9	—	—	—	—	9	240,200dwt 10,500(G)	—	—	9	240,200dwt 10,500(G)
TOTAL	42	697,700dwt 33,700(G)	42	—	—	—	—	42	697,700dwt 33,700(G)	—	—	42	697,700dwt 33,700(G)
SPAIN													
Sociedad Espanola De Construccion Naval, Madrid	5	59,500	5	—	—	—	—	5	59,500	3	22,500	2	37,000
Union Naval De Levante S.A. Grao-Valencia	1	8,450(G)	1	—	—	—	—	1	8,450(G)	1	8,450(G)	—	—
TOTAL	6	59,500dwt 8,450(G)	6	—	—	—	—	6	59,500dwt 8,450(G)	4	22,500dwt 8,450(G)	2	37,000
SWEDEN													
Eriksbergs Mek. Verkstads A/B Gothenburg	29	635,100	29	—	—	—	—	29	635,100	—	—	29	635,100
A/B Gotaverken, Gothenburg	17	34,800dwt 187,600(G)	16	1	—	—	—	17	34,800dwt 187,000(G)	—	—	17	34,800dwt 187,000(G)
Helsingborgs Varfs A/B	1	4,150(G)	1	—	—	—	—	1	4,150(G)	—	—	1	4,150(G)
Kockums Mek. Verkstads A/B Malmo	27	524,000	18	9	—	—	—	27	524,000	—	—	27	524,000
A/B Lindholmens Varv, Gothenburg	4	81,000	4	—	—	—	—	4	81,000	—	—	4	81,000
AB Oskarshamns Varv., Oskarshamn	2	21,000(G)	2	—	—	—	—	2	21,000(G)	—	—	2	21,000(G)
Oresundsvarvet A/B., Landskrona	7	84,000(G)	7	—	—	—	—	7	84,000(G)	—	—	7	84,000(G)
Uddevallavarvet A/B. Uddevalla	14	156,600(G)	13	1	—	—	—	14	156,600(G)	—	—	14	156,600(G)
TOTAL	101	1,274,900dwt 453,350(G)	90	11	—	—	—	101	1,274,900dwt 453,350(G)	—	—	101	1,274,900dwt 453,350(G)
UNITED STATES OF AMERICA													
Bethlehem-Sparrows Point Shipyard, Sparrows Point, Md.	20	467,500	—	20	—	—	—	20	467,500	7	143,200	13	324,250
Bethlehem Steel Co., Shipbldng. Division, Quincy, Mass.	15	457,600	—	15	—	—	—	15	457,600	1	26,950	14	430,650
Newport News Shipbuilding & Dry Dock Co., Newport News, Va.	13	356,670	—	13	—	—	—	13	356,670	9	240,670	4	152,000
Sun Shipbuilding & Dry Dock Co. Chester, Pa.	9	249,165	—	9	—	—	—	9	249,165	6	159,665	3	89,500
Todd Shipyards Corp., Houston Division, Houston	1	3,600	1	—	—	—	—	1	3,600	1	3,600	—	—
TOTAL	58	1,534,535	1	57	—	—	—	58	1,534,535	34	996,400	24	538,135
GRAND TOTAL	730	12,765,975dwt 1,556,920(G)	385	326 5 turbo-elec.	14	198	3,682,660dwt 235,310(G)	532	9,083,315dwt 1,321,610(G)	201	3,866,735dwt 176,950(G)	529	8,899,240dwt 1,379,970(G)

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C. P. Clark *J. N. Mackendrick* *E. G. Beardsley* *R. F. Moser* ***F. W. Laverty*** *G. W. Probst*

Tanker Register

A new edition of the "Register of Tank Vessels of the World" has been published by Esso Shipping Co., 30 Rockefeller Plaza, New York, at $20 postpaid. The register reports on vessels of all owners and under all flags, giving all pertinent information. The register is published in loose leaf form and Esso Shipping supplies supplements for insertion between editions.

Clark Brothers Promotions

C. Paul Clark has been elected chairman of Clark Brothers Co., Olean, N. Y., as one of a group of changes in the company's official family. Mr. Clark is a son of the founder, has been with the company since 1918 and has been president since 1936.

John N. Mackendrick has succeeded Mr. Clark as president. He has been vice president in charge of engineering since 1946, and previously was chief engineer. He is succeeded by Edward G. Beardsley, formerly chief engineer. Richard F. Moser was named vice president in charge of manufacturing.

Newly elected executive vice president is F. W. Laverty, former general sales manager. Sales have been entrusted now to George W. Probst, who becomes vice president to succeed David K. Hutchcraft, retired. Mr. Probst formerly was manager of Tulsa offices. Frederick H. Light also has retired as secretary-treasurer, a job to be filled by C. C. Hill.

Orders Platformer Compressors

A contract for the building of two 1,000 hp gas compressors for the new Platforming unit at the Lima refinery of the Standard Oil Co. (Ohio) has just been awarded to the Cooper-Bessemer Corp. of Mount Vernon, Ohio, by Procon, Inc., of Chicago, the general contractor on the Lima job. The two compressors, which will be delivered in the fall, will cost $145,000.

To Expand Amarillo Plant

The Texas Co. has awarded a multi-million dollar contract in connection with the complete modernization of its Amarillo, Texas refinery to The M. W. Kellogg Co. Effect of the program will be virtually to double the current capacity of the refinery. Other major processing equipment in addition to that under contract to Kellogg has also been scheduled.

Kellogg-designed units will include crude distillation, delayed coking, Orthoflow fluid catalytic cracking and catalytic polymerization, the first two of which are integrated into a combination unit.

Approximate capacities in barrels per stream day of feed are as follows: crude distillation, 15,500; delayed coking, 3,600; and cat cracking, 6,000 (about 10,000 with recycle). The polymerization unit is rated at about 470 barrels per stream day of polymer gasoline. These figures are based on the processing of Panhandle crude, although the refinery is also designed to handle Hockley crude.

Appointed Chief Geophysicist

George J. Blundun has been appointed chief geophysicist of Federated Petroleums Ltd. and Home Oil Co. Ltd. Mr. Blundun served as geophysicist with the Gulf Research and Development Co. for three and one-half years, and as chief geophysicist with Northwest Seismic Surveys Ltd. for four and one-half years until his present appointment.

Made Vice President of Platte

Frank C. Havens, formerly treasurer, has been elected a vice president of Platte Pipe Line Co. John T. Osborn has been elected treasurer and James T. Noel has been elected controller. Mr. Osborn has been assistant treasurer, and Mr. Noel has been chief accountant.

Houdriflow Operations Review

A review of two years of commercial Houdriflow operation has been prepared in a brochure published by Houdry Process Corp., Philadelphia. Ten installations are discussed. Copies are obtainable on request.

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DU PONT

PETROLEUM CHEMICALS DIVISION NEWS

DU PONT

June ★ *One of a Series of Interest to the Petroleum Industry* ★ *1953*

NEW WEST COAST DELIVERY FACILITIES

As a service to refiners without rail sidings in the Southern California area and as a convenience for all refiners requiring urgency shipments of tetraethyl lead, Du Pont recently set up facilities for delivering TEL by tank truck.

Located adjacent to Du Pont's El Monte district laboratory, special truck-loading facilities include a rail siding, an 8,500-gallon weigh tank in the all steel TEL building and a 10,000-gallon gasoline tank.

To get the program into operation required more than just specially-built tank truck trailers. A weigh tank like the ones used in refinery blending plants was needed. To load the trucks, the TEL must first be transferred into the weigh tank from railroad tank cars. The procedure is the same as unloading a tank car at a refinery.

Loading the truck for shipment is similar to the procedure involved in transferring TEL from a refinery weigh tank to a standby tank. The tank truck trailer is constructed with the same dome as used on railroad TEL tank cars.

The eductor is used to pull vacuum on the trailer through a one-inch hose attached to the trailer's vent plug. This draws the compound from the weigh tank into the trailer. Any known quantity can thus be weighed out into the trailer.

This close-up of the tank truck facilities shows the 2-inch Du Pont-designed Metalflex hose used in loading the trucks as well as for unloading railroad tank cars.

With a 10,000-gallon gasoline tank to provide circulating fluid for the eductor, the entire setup closely resembles a refinery blending plant. As such, it will be possible to use the plant for training customer blending personnel.

Because of these added facilities, all refiners in the Southern California area are assured prompt, conveniently scheduled deliveries of Du Pont TEL.

Radioactive Tetraethyl Lead Throws New Light on Engine Deposit Formation

Since deposits formed in combustion chambers of automotive and aircraft engines produce undesirable effects, petroleum engineers and engine designers have long sought a method of eliminating them.

It may be possible to accomplish this if the mechanism of their formation and scavenging is understood more completely. However, the lack of a direct method for following the formation while it is occurring has made the study of combustion chamber deposits difficult. The appearance of deposits at any time during their formation *only suggests* the processes which have occurred. But now, the use of tetraethyl *radiolead* in tracer amounts in the fuel provides a new procedure for such study.

DEPOSIT FORMATION WITH TETRAETHYL LEAD IN ABSENCE OF HALOGENS

PHOTOGRAPH AUTORADIOGRAPH*

CONDITIONS:
101 Hours with 3 ML. Tel (Straight)/Gal. + 0.5 Hours with 3 ML. Tetraethyl Radio Lead (Straight)/Gal.

*BLACK = Radioactive Deposits.

The deposit on the cylinder head at left has reached "equilibrium," but has not yet been exposed to operation with tetraethyl radiolead. After being exposed to short operation with radiolead, the autoradiograph of the same cylinder head on the right shows that the most recently formed deposits concentrate on the thicker deposit surfaces.

The technique of studying deposit formation through the use of tetraethyl radiolead was developed at the Du Pont Petroleum Laboratory. It was revealed to the industry in a paper recently presented by Du Pont chemists to the Division of Petroleum Chemistry of the American Chemical Society.

The radioactive lead used in the Petroleum Laboratory's investigations is radium D. This is one of the decomposition products of the uranium series.

USE OF X-RAY FILM

The exact location and distribution of the radioactive lead salts deposited in the chamber can be detected by X-ray film. By this technique, it is now possible to observe the formation and removal of deposits resulting from tetraethyl lead during a relatively short time at any stage of the deposit growth.

It also indicates the importance of temperature and physical state of a surface in influencing deposit laydown. And the new technique can be used to demonstrate the efficiency of halogen scavenging.

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

OVER

DU PONT

PETROLEUM CHEMICALS DIVISION
NEWS

DU PONT

CONTINUED *Radiolead*

THERMAL FACTOR

Using radioactive lead as a tracer element, it was found that new deposits form more rapidly on the thicker deposit surfaces than on the thinner deposit or bare metal surfaces. It is believed that this is due to the difference in temperature of these surfaces which produces a sintered surface condition on thick deposits. This condition is conducive to adhesion of fresh deposit.

HALOGEN EFFICIENCY

Halogens ordinarily are used with tetraethyl lead to reduce the amount of deposit in the hotter portions of the combustion chamber. These form lead halides which are too volatile to remain on these hot surfaces.

The Petroleum Laboratory's investigations with radioactive lead showed that established deposits can be scavenged by halogens in the fuel through gas-solid reactions to form volatile lead halides. This scavenging action of halogens also greatly reduces the formation of new deposits on exhaust valves.

DEPOSIT MIGRATION OBSERVED

A previously unrecognized type of scavenging mechanism can now be observed. The migration of deposits within the combustion chamber has long been suspected. But it was not possible to demonstrate this mechanism.

The use of tetraethyl radiolead enables the researcher to see clearly how small particles of the deposit are constantly transferring from one location to another. This process has been called "flecking." It differs from *flaking* caused by rupture of bonds deep-down in the deposit which results in the breaking off of relatively large pieces. This occurs only after relatively long periods of engine operation.

Flecking, on the other hand, occurs continually from the surface of the deposit. And this migration process appears to be responsible for almost all the exhaust valve deposits when halogens are present in the fuel.

This work with radioactive tetraethyl lead is part of Du Pont's continuing study of engine deposits. The aim of this project is to help petroleum and automotive engineers find a practical method of eliminating or controlling combustion chamber deposits.

Du Pont Gadget Show Displays "Ideas"

MECHANICAL INGENUITY is one of our country's most valuable assets.

We are always looking for some gadget to do a job more easily, cheaply, efficiently, or safely. An excellent example of this is the way Du Pont employees representing many of the company's 73 plants and 38 laboratories have applied their inventiveness to solving operations problems.

Since many of the Du Pont employee inventions have broad application in refineries, the company has wrapped them all up into a single traveling exhibit. None of the items displayed are either patented or sold by Du Pont.

Here are just a few examples of the devices included in the show:

1. Scissors-like railroad chock to safeguard workmen's hands.
2. Asbestos heat insulator for gas cylinders.
3. Neoprene-impregnated paper cap. Can be thrown away if splattered with chemicals.
4. Valve lock-out cover to assure safe pipeline maintenance.

Now on tour, the exhibit will be shown in the major refining areas of the country with a Du Pont representative on hand to answer questions.

West Coast District Manager

GEORGE L. TYLER, manager of the Petroleum Chemicals Division West Coast District, came with Du Pont in 1947.

Mr. Tyler's broad experience in the oil industry dates back to the oil fields of Texas in 1921. In 1922 he became associated with the Pacific Gasoline Company which later became part of the Standard Oil Company of California. In 1929 he joined the land department of the Shell Oil Company. He became secretary-treasurer of the California Natural Gasoline Association in 1938.

His first assignment with the Du Pont Petroleum Chemicals Division was as a sales-service representative in the West Coast district. He was appointed manager of this district in 1949.

Mr. Tyler is a graduate of the University of Southern California Law School, and has taken extension courses on petroleum technology.

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A-55??

Printed in U. S. A.

Heads Garlock Advertising

Richard C. McGonigal has been appointed advertising manager of The Garlock Packing Company, Palmyra, N. Y., to succeed Ralph J. Hinkle, who has been advertising manager since 1929. Mr. Hinkle will continue actively with Garlock as a vice president.

Knight Elected Catalytic Executive Vice President

Alan T. Knight has been elected to the newly created position of executive vice president of Catalytic Construction Company. Mr. Knight had been a vice president of the company since its organization in March, 1946, specializing in labor relations as they apply to the construction field. Before joining Catalytic, he was associated with the Sun Oil Company for 19 years.

A. T. Knight

D. S. Simon *E. A. Kelley* *W. F. Dressen* *R. L. Crain*

Zeolite Bulletin

"Zeolite Water Softeners" is the title of a new bulletin on the principles and details of zeolite water softening, prepared by the technical department of Graver Water Conditioning Co., 216 West 14th Street, New York 11, New York.

Graves Honored on Retirement

Prior to his retirement on April 30 as a director, vice president and chairman of the eastern division operating committee of the Tide Water Associated Oil Co., B. I. Graves was honored and feted on three occasions for his 43 years of service and association with the company.

Ceremonies were held at the company's New York offices at 17 Battery Place, where Mr. Graves received an inscribed and bound scroll bearing the signatures of the more than 500 employees of the New York office. He also was honored at a testimonial dinner at the Union Club and a luncheon at India House.

Mr. Graves will continue in the oil business, following his retirement, as an oil consultant with offices at 52 Wall Street, New York City and in California.

Otis Pressure Control Promotions

Otis Pressure Control Inc., Dallas, has established a new East Texas-North Louisiana division, opened a new office in Oklahoma, and announced the appointment of three new division managers to staff the enlarged service facilities.

D. S. Simon is in charge of the new division which will have headquarters in Longview. E. A. Kelley has been transferred to Corpus Christi, Texas, as division manager. He is succeeded as manager in Odessa, Texas, by William F. Dressen who formerly was division superintendent at Corpus Christi. Bob L. Cain has been promoted to northern division manager at Oklahoma City. A new office in Oklahoma has been opened at Pauls Valley with Nat Green in charge.

Oscar Payne Named Vice President

Oscar Payne has been elected executive vice president of Watts, Payne-Advertising, Inc., Tulsa and Dallas. He continues also as treasurer. Mr. Payne's former duties as secretary have been taken over by Don Mitchell, radio and TV department head. Benton Ferguson has been appointed vice president in charge of public relations.

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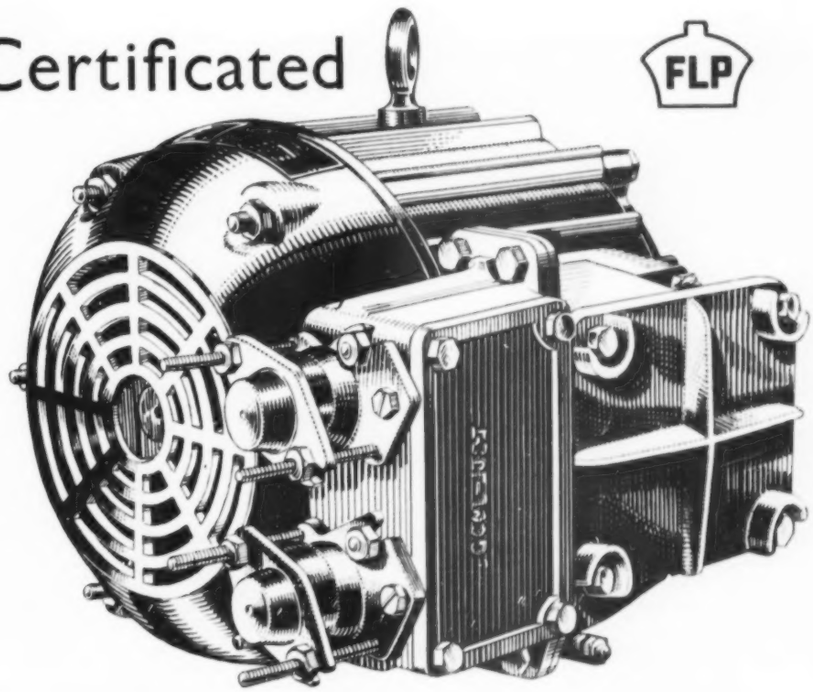

In a C.P. Flameproof motor you get a machine which is not only completely safe in petrol-laden atmospheres but has also the robust work-proved features of all Crompton Parkinson motors—the bearings fitted to the closest tolerances laid down by the bearing maker, the ground-all-over shaft, the new impregnation which is impervious to high working temperatures, dirt and oil. C.P. Flameproof motors are available in a range of electrical characteristics and mechanical arrangements.

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SSC Promotions

Seismograph Service Corp., Tulsa, recently promoted three of its key men. Richard A. Pohly was elected a vice president, R. S. Finn was elected vice president of Lorac Service Corp. and manager of Lorac Maritime Corp., SSC subsidiaries, and F. B. Leedy was elected a director and treasurer.

Mr. Pohly has been engaged in geophysical work since 1937, serving with Shell and a number of contract geophysical companies. Mr. Finn has been with SSC since 1938, during which time he has served in Argentina and Venezuela and visited operations in other Latin American countries, Europe and the Middle East. He has been manager of instrument research for the past year. Mr. Leedy also is an SSC veteran with some 19 years of service in the United States, Argentina, Colombia, Bahamas, B.W.I., and Canada. He has been assistant treasurer since 1951, when he returned from Canada where he was operations manager.

Kansas City Desk and Derrick Elects President

Miss Harriet Gregath of Tide Water Associated Oil Co. has been elected the first president of the new Desk and Derrick Club of Kansas City. Other officers chosen are as follows: Mrs. Dorothy Southern, Cooperative Refinery Association, vice president; Mrs. Rita Michaels, Platte Pipe Line Co., recording secretary; Mrs. Marion Marley, Wayne Pump Co., corresponding secretary; and Mrs. Ella M. Plympton, Missouri Valley Oil Co., treasurer.

Du Pont Appoints Cornwall

Barry V. Cornwall has been appointed assistant manager of sales for the eastern district of du Pont's petroleum chemicals division. Mr. Cornwall will be associated with A. R. Mullis, manager of the eastern district, with headquarters at 1810 RKO Building, 1270 Avenue of the Americas, New York City.

R. A. Pohly

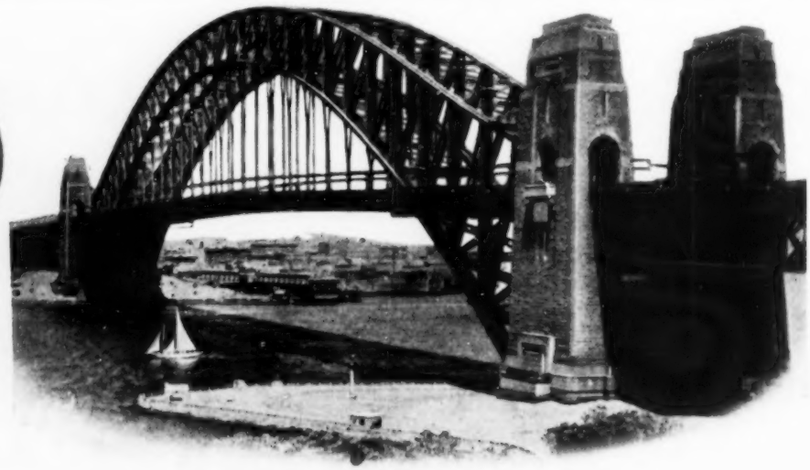
R. S. Finn

F. B. Leedy

World's Largest Unitized Block and Hook

"Newest and biggest" is Ideco's phrase for its "Big Shorty," latest addition to the Ideco block line. Rated at 400 tons, the "Big Shorty" has been designed for deepest drilling. A unique convertible feature has been incorporated in this new block. It can be initially furnished as a conventional traveling block and then later changed, in the field, into a combination block and hook by the addition of the Shorty Block hook assembly. Unitized in this manner, the "Big Shorty" has an overall length of only 12 feet 8 inches. The weight with hook is 16,700 pounds.

What is happening in SYDNEY?



An associate company of *International*, in the course of its operations, is passing on to the main U.K. factory at Felling-on-Tyne the benefit of its *on-the-spot* experience, and in return is deriving advantage from the wealth of technical knowledge which this central factory has amassed.

And in 14 other cities associated companies are doing likewise. Thus *International*, with this world-wide co-operation, is able to produce paints for every climate and purpose. For the Oil Industry *International* RED LEAD GRAPHITE PRIMER and *International* ALUMINIUM PAINT are made for storage tanks. SUNLIGHT SYNTHETIC ENAMEL is for all general purpose use. And there are many specialities, too, such as DRUM PAINTS, and TANCTECTOL, a paint that is resistant to benzine, petroleum, white spirit, etc. and is used in the interiors of storage tanks, road and rail cars, etc.

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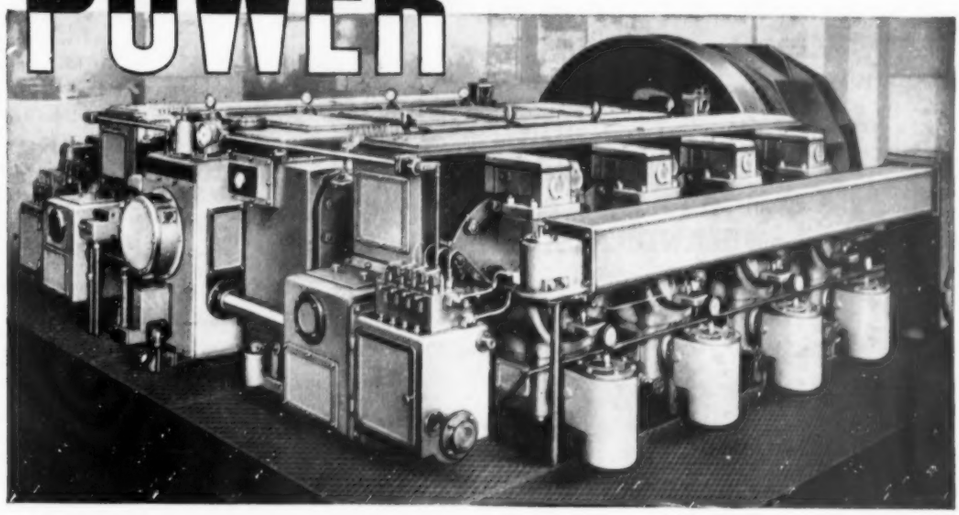

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G. S. Sangdahl

Organic Chemicals Catalog

Shell Chemical Corp. has published a new "Organic Chemicals" catalog which devotes almost 100 pages to the properties, specifications, and applications of the company's solvents, industrial chemicals, resins, and plastics. Copies of the catalog can be secured at any of the Shell Chemical sales offices.

Changes Department Name

The name of the petroleum chemicals department, industrial chemicals division of American Cyanamid Company, has been changed to refinery chemicals department. The refinery chemicals department will handle the full line of synthetic fluid cracking catalysts, specialty catalysts, lubricating additives and drilling mud conditioners.

Chicago Bridge Promotes Sangdahl

George S. Sangdahl was elected a vice president of the Chicago Bridge & Iron Company on April 13, 1953. He has been associated with the company since Jan. 15, 1915. Mr. Sangdahl started working in the sales department of the Chicago Bridge & Iron Co. doing design and estimating work. He was a manager of the Montreal, Que., sales office of the company's Canadian affiliate, Horton Steel Works, Ltd., for five years, and has been manager of the company's Cleveland sales office since 1925.

On May 4, Mr. Sangdahl became manager of a new sales office which the Chicago Bridge & Iron Co. opened in Pittsburgh, Pa. It is located in the Alcoa Building.

Westinghouse Buys Failing

Westinghouse Air Brake Co., Pittsburgh, has purchased the George E. Failing Supply Co., Enid, Okla. It is the second oil industry supplier bought by Westinghouse recently. Last year the LeRoi Co. of Milwaukee was purchased.

Failing is reported to be the largest manufacturer of shallow drilling equipment. Sales in the year ended July 31, 1952 totaled $6.3 million. George P. Gregory, Jr., is export agent.

Forms New Company

Hearn J. Paschall has formed Pico Oil Tools Inc., a new company with headquarters in California. Mr. Paschall was formerly associated with the H. C. Smith Co., and traveled the oil world over in their interest. He left this company April 1 to form the new company to be engaged in developing a revolutionary new method of controlled directional drilling and keeping holes straight. Officers of the new company are Merkal C. Johnson, president; Hearn J. Paschall, vice president in charge of sales; Roger Stokes, treasurer; Mark Haines, secretary and chief engineer; and C. W. Byres, chief counsel.

Courtney Heads Unit Rig

Paul Courtney has been elected president and a director of Unit Rig & Equipment Co., Tulsa. He succeeds Ray Carter, who was elected chairman.

Mr. Courtney resigned as vice president of Emsco Mfg. Co., Houston, to accept the Unit Rig assignment. He had been with Emsco since 1938 and previously had been with Shell in Venezuela and with Sinclair in Oklahoma.

New Catalyst Plant

National Aluminate Corp., Chicago, recently announced the construction of a new catalyst plant in South Gate, Calif. The plant is designed for the production of microspheroidal grades of petroleum cracking catalyst. Construction began in May and full-scale production is anticipated by January 1, 1954.

H. J. Paschall

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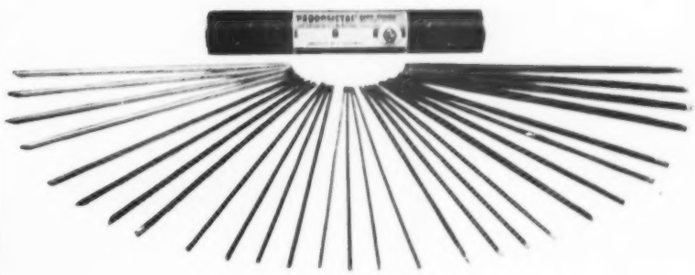

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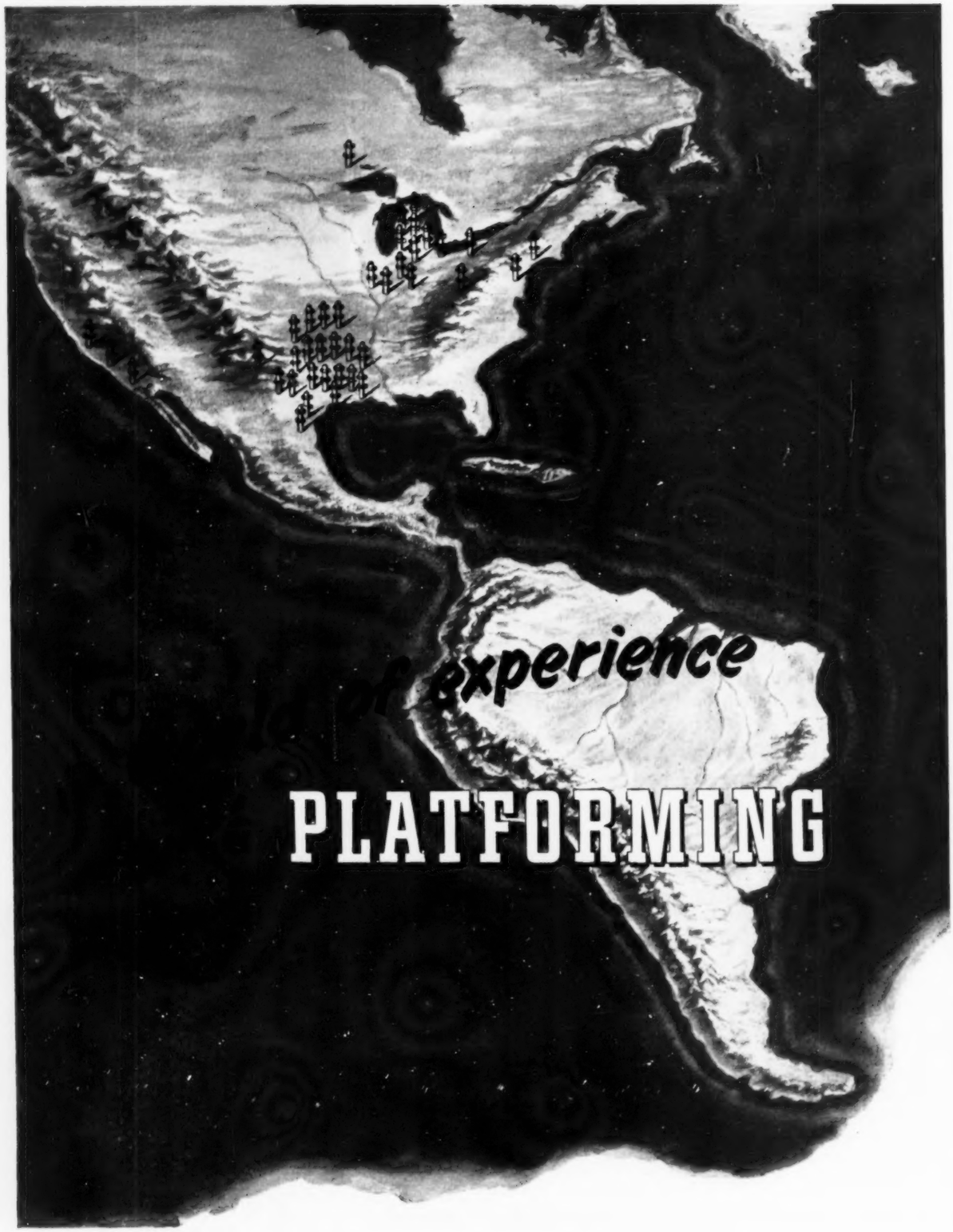
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Washington Notes

(Continued from page 33)

might be brought in later on. The former criminal case subsequently was dropped.

Brownell said the companies have been working hand in hand since 1929 to:

"1. Secure and exercise control over foreign production and supplies of petroleum and petroleum products.

"2. Regulate imports in order to maintain a level of domestic and world prices agreed upon by the defendants, and

"3. Divide world foreign producing and marketing territories."

Listed in the complaint were 21 principal contracts or agreements which, the government says, set the pattern for the antitrust law violations. Also listed were 33 jointly-owned companies which the government charges were created to carry out the alleged "conspiracy and monopoly."

Ahead were a series of motions, including some from the government, asking the companies named to produce large volumes of their records, and some from the companies asking a transfer of the case to New York instead of Washington, D. C. On each of the motions argument was expected, an argument in which the companies have more chance to make a case now that the proceedings are civil in nature than when they had been criminal.

Tidelands Bill Passed

The U. S. Congress, after a 16-year battle, has settled one phase of the controversy over ownership of the offshore submerged lands, but other major phases are due to continue in dispute for years. The settlement came May 5 when the Senate voted 56 to 35 to enact legislation giving back to Texas, Louisiana and California title to their offshore submerged lands out to historic boundaries. The lands were taken away from the states by three decisions of the U. S. Supreme Court in 1947 and 1950. The measure was silent about the outer belt of the offshore, submerged lands.

On May 13, the House adopted this version of the legislation, in place of that which it had passed earlier. By a vote of 278 to 116, the House voted to enact the Senate measure as a substitute. The action sent the bill to the White House for signature into law.

On the same day, meanwhile, the House also voted 309 to 91 to enact a second bill, dealing with the outer belt of the continental shelf. The measure would give the federal government paramount authority over oil and gas development in the outer belt.

The settlement, although it had been the major objective of the coastal states for many years, is to be followed by other legislative moves in Congress, new administration activities, and, possibly, by litigation which could again go to the U. S. Supreme Court for final decision.

The Senate bill carried no provision for either federal or other development of oil and natural gas in the continental shelf 200 miles beyond the traditional boundaries of the individual states. The House bill gave the federal government complete control and deprived the adjoining states of any police, conservation or taxing powers.

Another legislative battle is in prospect on submerged lands beyond historic boundaries; three miles for most states, 10.5 miles for Texas and Florida.

Enactment of the quitclaim bill does not mean that drilling in the coastal area will be resumed immediately. Delay is foreseen for several reasons. One is that opponents of quitclaim legislation have threatened new lawsuits about the constitutionality of the tidelands bill. Whether such suits actually will be filed, or whether the threats were made to strengthen the hand of opponents of the bill, is yet to be seen.

Even if no lawsuits are filed, it may be a year or two before the actual historic boundaries of Texas and Louisiana are defined. In the case of Texas, experts believe the job will be relatively simple, because the coast line is regular. The problem with respect to Louisiana, however, is more complex. Because of the state's extremely irregular coastline, it may take two to three years to determine just where the three-mile outside boundary actually lies.

Jet Lubricant

A synthetic jet engine lubricant has been announced by Standard Oil Development Co. The new type of lubricant was developed by S.O.D. and its affiliated research laboratories in England. It is the first product approved under the United States Military Specification MIL-L-7808. The present product is comprised chiefly of esters not yet derived entirely from petrochemicals.

Deacon Visits Latin America

John V. Deacon, assistant manager of sales promotion and advertising of Westinghouse Electric International Co., is visiting distributors and their advertising agencies in 12 Latin American countries to aid in developing their product campaigns for 1953. His itinerary includes Cuba, Haiti, Dominican Republic, Puerto Rico, Curacao, Trinidad, Venezuela, Colombia, Peru, Panama, Costa Rica and Guatemala.

New Corrosion Inhibitor

The Tretolite Co. has developed a new oil-soluble organic corrosion inhibitor, especially designed to prevent corrosion and rust formation in pipe lines, tankers and storage. It is designated as Kontol 77, and has been developed for protection against acidic components found in crude oils and has been demonstrated to be effective against rusting caused by the presence of oxygen in finished petroleum products. Employing ASTM Test D-665, aviation grade gasolines are rendered non-rusting when inhibited with only 3ppm Kontol 77.

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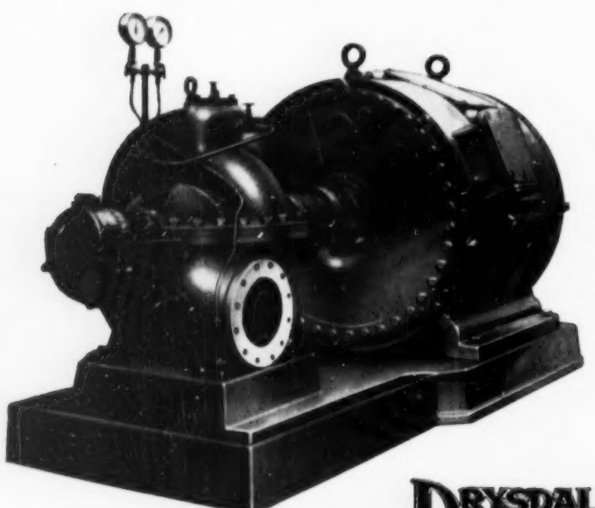

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*Illustrated in our *Export Review are Road tankers, Pipe-transporters, Self-loaders, Personnel carriers and other vehicles of special interest to Oil Transport Executives.*

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THORNYCROFT

WRITE FOR A COPY TO: JOHN I. THORNYCROFT & CO., LIMITED
DEPT. W.P. THORNYCROFT HOUSE,
SMITH SQUARE, LONDON, S.W.I., ENGLAND.

Japanese Shipyards Busy

(Continued from page 47)

L.R., 14.75 knots. Started September 1952, completed September 1953. Built at the Kawasaki Heavy Industries. Total cost $4,166,666, unit cost per dwt $211.

Nitto Shosen Kaisha, Kyokuei Maru, 18,503 dwt, diesel, 7,000 hp, L.R., 14.3 knots. Started November 1952, completed June 1953. Built at Harima Shipyard. Total cost $3,611,111, unit cost $195 per dwt.

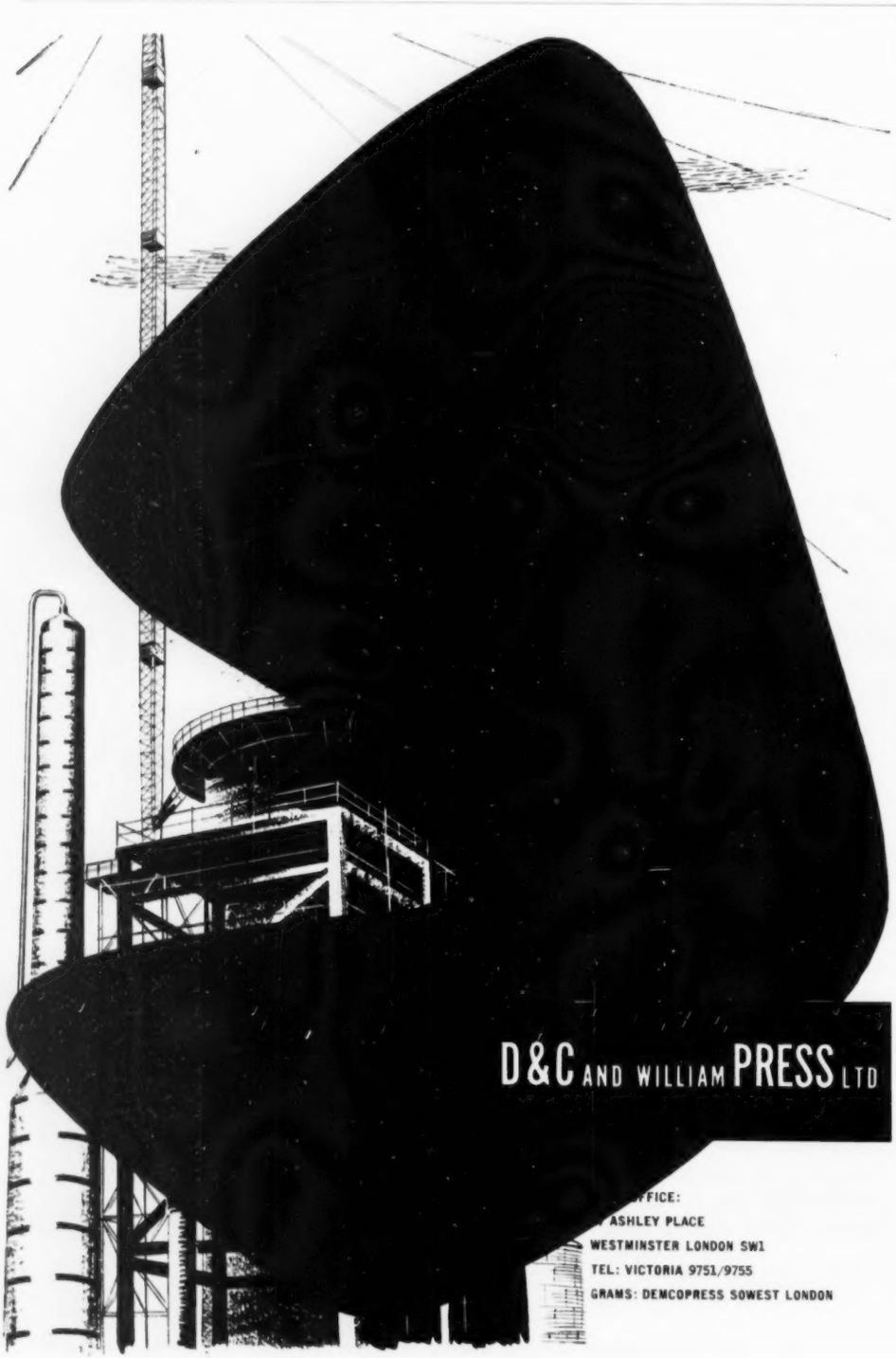
Nitto Shosen Kaisha, Koei Maru, 18,700 dwt, diesel, 7,000 hp, A.B., 14.5 knots. Built at Mitsubishi Nippon Heavy Industry. Started December 1952, completed July 1953. Total cost $3,833,333, unit cost $204 per dwt.

Nippon Yusosen Kaisha, Persian Maru, 20,176 dwt, turbine, 9,200 hp, A.B., 15.5 knots. Started December 1952, completed October 1953. Built at the Mitsubishi Shipyard. Total cost $4,166,666, unit cost $206 per dwt.

Taiheiyo Marine Transportation, unnamed, 20,176 dwt, turbine, 9,200 hp, L.R., 15.5 knots. Started November 1952, completed September 1953. Built at Mitsubishi Shipyard. Total cost $4,305,555, unit cost $213 per dwt.

Taikyo Oil Co., unnamed, 19,979 dwt, turbine, 9,000 hp, L.R., 15.5 knots. Started December 1952, completed August 1953. Built at the Harima Shipyard. Total cost $4,166,666, unit cost $208 per dwt.

In addition, the Mitsui Sempaku Kaisha, with a loan of $2,800,000 from the Bank of Japan, has started construction this March on an unnamed oil tanker. Scheduled for completion this December at the Mitsui Shipyard, the new vessel will be as follows: 19,200 dwt, diesel, 8,200 hp, with an L.R. classification. It will develop a sea speed of 14.2 knots.



Thus, within the space of this calendar year, Japan will add to its own tanker fleet 12 new oil tankers, more than 30 percent of the entire present fleet. These ships will be placed on the Persian Gulf and Aruba-Curacao runs, it has been stated.

But tanker construction within this nation is by no means confined to domestic building. Already completed and turned over to foreign owners such as the Sktieselskbet Glittre of Norway, Maersk of Denmark, East Asiatic of Denmark, East Asiatic Ltd. of Liberia, and the Compania de Navagacion Las Cruces, S.A., and the Unitas Inc., both of Panama, have been seven oil tankers, in the span of June 1950-October 1952 completion dates. This amounted to a total contracted cost of some $20 million, the oilers grossing between 11,000 and 15,000 tons, with deadweight tonnage varying between 15,500 and 24,000.

The Kawasaki Heavy Industry turned a 28,000 dwt tanker over to its Panama owners, the Ocean Oil Co., in February this year, contract cost of $5,194,000; Harima Shipyard turned a 20,000 dwt tanker over to the Markos P. Nomikos firm (Greek) for $4,267,200 in March; Nippon Kokan Tsurumi Yard delivered a 20,000 dwt vessel to Liberia's Republic Marine Corp. at a contracted cost of $3,980,000 in February; Mitsui, a 19,225 dwt oil carrier to Maersk of Denmark, costing $3,741,000 in February; Kawasaki one of 19,800 dwt to Panama's Compania de Navagacion, Prote Flanigan and Liveland Norness Shipping, cost of $3,960,000, in March; Mitsubishi Shipyard, one of 26,650 dwt, to the U.K.'s Standard-Vacuum Transportation Co. at a cost of $5,343,833, also in March; and the Hitachi-Innoshima shipyard, one of 19,000 dwt, to Panama's Compania de Navagacion Las Cruces, S.A., cost of $3,277,500, also this March. Mitsubishi Shipyard turned over a 24,000 dwt tanker to Panama's Trans-Ocean Carriers, costing $4,608,000, in April; Kawasaki Heavy Industries a 19,800 dwt tanker to Liberia's Oceanic Shipping Co., costing $3,960,000, also in April; Hitachi-Sakurajima shipyard a 19,000 dwt oiler to Panama's Compania Navagacion Las Cruces, S.A., costing $3,277,500, in May; Uraga shipyard, a 20,000 dwt oiler to the Tanker Transportation of Panama City, costing $4,020,000, in May; Nippon Kokan-Tsurumi shipyard, a 20,000 dwt oiler to Panama's Transoceanic Carriers Co., costing $4,040,000, in May; and Nippon Kokan-Shimizu Dockyards, another 20,000 dwt oiler, costing $4 million, also in May, this to the Miramonte Compania Navierd, S.A., of Panama.

In June this year, the Mitsui shipyard will hand over to the Seabira Tanker Corp. of Panama a new 19,000 dwt diesel tanker, costing $3,920,000. In August, Mitsubishi shipyard will deliver to the Standard-Vacuum Transportation Co. of the U.K. another 26,650 dwt turbine tanker, A.B. classification, with a speed of 17 knots, costing $5,343,833; and in October, Kawasaki Heavy Industries completes a 28,000 dwt tanker for Ocean Oil Operation, Inc., of Panama, for a cost of $5,600,000.

Nor is this the complete oil tanker picture in Japan. There is the major project underway at the former Kure Naval yards, taken over temporarily from the Japanese Government by the United States firm, the National Bulk Carriers.

The Petro Kure, with a deadweight of 38,000 tons, a turbine tanker with A.B. classification, 12,500 hp, and 12 knot speed, has been completed at Kure at a total cost of $5,700,000 and a unit cost of only $150 per deadweight ton.

In April, she was joined by the Petro King, of exactly the same tonnage, classification, engine capacity, speed, and total and unit cost. Three more large-scale oil tankers, with the same measurement and cost, will be added by the National Bulk Carriers, Inc., in July 1953, October 1953, and February 1954. These latter three oil-carriers have not as yet been christened.

Heads West Texas-New Mexico Division

William B. Gallman has been appointed West Texas-New Mexico division manager for Security Engineering division, Dresser Operations, Inc. He formerly was general manager of West Texas Rig Co.

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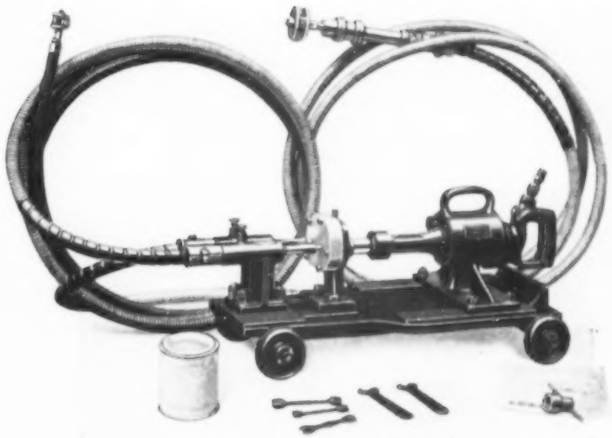

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The National Interest in Reserve Producing Capacity

(Continued from page 57)

tions of present and needed magnitude entirely by sales in countries other than the United States.

It is burdensome for all countries that are non-producers of oil or that do not produce their needs to purchase their present consumption, and it would be utterly impossible economically for them to purchase their full actual requirements, except in a few cases of small, highly industrialized countries.

As examples: Argentina produces 60,000 barrels of oil daily and imports 90,000. An additional 300,000 barrels daily is required for the proper and needed development of the country, but Argentina does not have the resources with which to purchase this additionally needed oil and it cannot have it unless it can be produced within its own boundaries. Brazil is in a similar position, as are most of the non-producing countries in the world, particularly those of large area and limited population. Thus, American foreign producers may not hope reasonably for considerably increased foreign sales because of the inability of nations to purchase more. Also, competition by producing organizations of other nations must be considered. They could cause the reduction of even the present magnitude of sales.

The primary objective, regardless of all other considerations, is to maintain adequate reserves in accessible areas from which oil can be drawn when the economy and the security of this and friendly nations demand it. This can only be done by maintaining reserves and producing capacity in this country and abroad. The stockpiling of petroleum by closing in a sufficient amount of production to provide for emergency requirements of this country is necessary to this program. The maintenance of fair and proper price structures and income tax accounting systems that will justify and permit the use of capital in the hazardous undertaking of searching for oil fields and for their development after discovery is essential. A reasonable import duty on foreign oil must be established to balance the necessary domestic price.

In order that we may bring into production sufficient oil to permit the closing in of that amount of oil required for emergency uses, the price structure for crude oil may even require upward adjustment. Income tax accounting laws may need liberalization or liberalized interpretations. Production controls as maintained by certain states would need to be expanded to all states and under state control.

Stripper wells and wells that make considerable water would have to be produced at their maximum efficient rate. Therefore, flush production and new fields would of necessity carry the burden of closed in production. Compensatory prices and laws or interpretations of existing laws would be essential to permit an operator to close in flush production to the extent that may be required. During the recent war, bonuses were paid to producers of oil from marginal wells. If flush production is closed in, it may be necessary to give some consideration to these producers in compensation for their locked reserves. Make-up oil or that required to supply the needs of the country after closing in 2,000,000 barrels or more must come from foreign sources.

Thus we would be able to conserve the national resources of oil, supply the emergency requirements of the nation, and preserve the "readiness to serve" position of the American companies operating in this and in foreign countries, supplying those foreign producing countries with dollars with which to provide modern economical and cultural facilities and aid generally in the distribution of petroleum and its products and the wealth generated by them throughout the world. The objective of primary, immediate importance is to maintain a stockpile of oil in the form of producible reserves sufficient for use of this and other nations in time of emergency, which we hope will not arise. It is further necessary that other nations that cannot purchase their full requirements develop their own resources for their own needs. Those that cannot do so within their own technical experience and skill or that do not have the necessary and experienced capital, must liberalize their laws in order that they may be assisted by those nations that have both the experienced personnel and capital.

Big Horn Extension Building

Construction has been commenced on Platte Pipe Line Company's $3 million extension into the Big Horn Basin of Wyoming. The new extension consists of 38 miles of 12-inch pipe line from Byron to Oregon, Wyoming, and 59 miles of 14-inch pipe line from Oregon to Platte's Chatham Station. When completed, it will permit Platte to serve directly the important Byron and Oregon areas of Wyoming's Big Horn Basin.

Named BS&B District Manager

James Dvoracek, sales manager, controls and safety head sales division, Black, Sivalls, & Bryson, Inc., has announced the appointment of Thomas Casey as Tulsa district sales manager for the controls and safety head division.

Mr. Casey has been with BS&B for the past seven years as a salesman in the Tulsa office and will make his new headquarters at the BS&B Tulsa plant, located at 15 North Cincinnati.

Transformer Buyer's Guide

The 1953 edition of the G.E. Instrument Transformer Buyer's Guide, containing basic, up-to-date information on the complete General Electric line, has been announced as available from the company at Schenectady 5, N. Y.

The fully illustrated, 102-page publication, GEA-4626F, contains ratings, ASA accuracy classifications, and prices of all G-E indoor and outdoor potential and current transformers. Listings of ratio and phase-angle tests, together with tables covering the mechanical and thermal limits of current transformers, are included.

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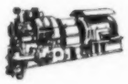

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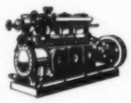

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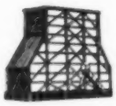

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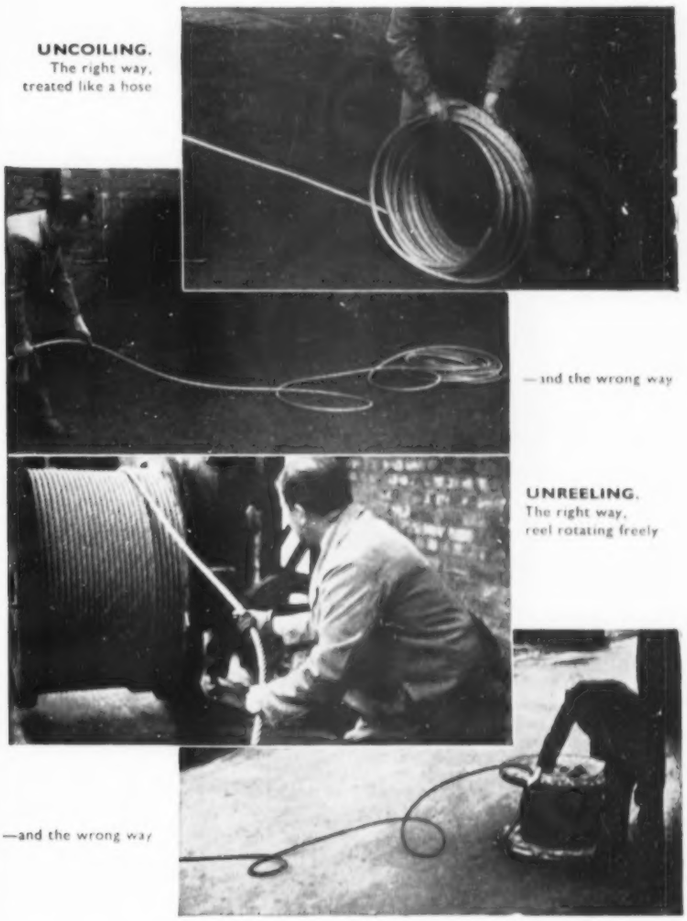
B1

IF ROPE COULD TALK . . .

"I'm mighty like a hose!"



UNCOILING. The right way, treated like a hose

—and the wrong way

UNREELING. The right way, reel rotating freely

—and the wrong way

Good rope repays care in handling. Never allow kinks to form when UNCOILING or UNREELING a steel wire rope. Treat it like a hose pipe. A light coil of rope may be unrolled along the ground but should always be kept under control. A reel may be placed on a turn-table or mounted on stands and supported by a bar or tube through the hole in its centre. In no case should a coil or reel be laid on the ground and the end taken over; kinks will inevitably form and the rope's life and efficiency be seriously reduced. When COILING down a rope always put in under-turns as required to counteract the tendency of the rope to twist itself. Under-turning is simple — the rope itself will indicate that.

Write for a copy of a new booklet "If Rope could Talk".

British Ropes Limited

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Wilcox Named Vice President of Westinghouse International

George L. Wilcox has been elected vice president in charge of sales and a director of the Westinghouse Electric International Co. Formerly general sales manager, Mr. Wilcox has been with Westinghouse since 1942 when he joined the Westinghouse Electric Corp. as a design engineer. He transferred to the International Company in 1943.

To Rebuild Grease Plant

Immediate action to build a new plant was announced by W. Harold Rea, president of Canadian Oil Companies, Ltd., whose lubricating oil and grease manufacturing plant at Montreal recently was destroyed by fire. The Montreal plant was opened only 18 months ago.

Opens New Headquarters

Aramco Overseas Co. has transferred its European headquarters office from Rome to The Hague. Offices now are at Adelheidstraat 300. R. S. Hatch has been elected executive vice president in charge of the new offices. He formerly was at New York. R. S. Fowler is vice president in charge of the Rome offices.

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- Production characteristics of wells
- Pneumatic pumping of oil wells
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Dr. E. E. Lyder *Dr. N. Schlechter*

Lyder and Shlechter to Bechtel

Dr. E. E. Lyder and Dr. Nathan Shlechter have joined Bechtel Corporation's industrial division at Los Angeles. Dr. Lyder, until he retired recently, had been general manager of the El Segundo refinery of Standard Oil Co. of Calif. He will be a Bechtel consultant on refinery and petrochemical plant engineering and operation.

Dr. Shlechter joins as a process design engineer in the fields of petroleum refining and petrochemistry. His career includes an extensive background in catalytic cracking and reforming.

Magcobar Promotions

Promotions in the Gulf Coast division of Magnet Cove Barium Corp. were announced recently by George Moore, general sales manager of Magcobar.

K. L. Byerly has been named Texas Gulf Coast division manager. J. Lee Popham has been appointed supervisor of the Abilene district and R. E. Hinchliffe is now district service supervisor at Lake Charles. Mr. Byerly formerly was district service supervisor in Lake Charles.

Mr. Popham has been an engineer in the Texas Gulf Coast division of Magcobar for two years. Mr. Hinchliffe has served as field engineer and district service supervisor at Houma, Louisiana.

National Aluminate Promotions

The National Aluminate Corporation of Chicago recently announced the promotions of Dr. David G. Braithwaite, Gage Averill and Herman R. Powers, each to the post of assistant vice president. Dr. Braithwaite is production manager and Gage Averill sales manager for National Aluminate's catalyst division. Herman Powers has been Nalco field manager of industrial sales and service since June 1951.

ADVERTISER'S INDEX *Advertising Agencies in Italics*

Anglo-Iranian Oil Co. Ltd. 61
S. H. Benson & Co. Ltd.
Arabian American Oil Co. 7
Audley Engineering Co. Ltd. 13
Marsteller, Gebhardt & Reed, Inc.
E. B. Badger & Sons Ltd. 6
Thames Advertising Service Ltd.
Harold Cabot & Co., Inc.
Bethlehem Steel Export Corp. 11
Gotham Advertising Co., Inc.
Black, Sivalls & Bryson, Inc. (Export Div.) 10
R. J. Potts-Calkins & Holden, Inc.
British Ropes Ltd. 91
D. J. Keymer & Co. Ltd.
Peter Brotherhood Ltd. 91
Rooster Publicity Ltd.
Butterley Co. Ltd. 9
Rowlinson-Broughton
California Texas Oil Co., Inc. 21
Erwin, Wasey & Company, Inc.
Carbometals Ltd. 83
Rooster Publicity Ltd.
Chicago Bridge & Iron Company 94
Russell T. Gray, Inc.
Cities Service Company 24
Albert Frank-Guenther Law, Inc.
Richard Costain Ltd. 20
Crompton Parkinson Ltd. 79
S. H. Benson & Co. Ltd.
Crossley-Premier Engines Ltd. 81
Osborne-Peacock Co. Ltd.
Davey Paxman & Company Ltd. 22
Rooster Publicity Ltd.
Dresser Industries, Inc. 18-19
Laughlin, Wilson, Baxter & Persons
Drysdale & Company Ltd. 86
Scottish Industrial Advertising
Dunlop Rubber Co. 26, 87
Charles F. Higham & Co. Ltd.
E. I. du Pont de Nemours & Co. 77-78
Charles L. Rumrill & Co., Inc.
Flexible Drives (Gilman's) Ltd. 89
Boswell & Barratt Ltd.
The Fluor Corporation Ltd. 93
Dozier, Eastman & Co.
Foster-Wheeler Corporation 63
Albert Frank-Guenther Law, Inc.
General Electric Co., International 5
Grant Advertising, Inc.
The Geolograph Co., Ltd. 76
Lowe-Runkle Company
Gulf Oil Corporation 4
Young & Rubicam, Inc.
J. P. Hall & Sons Ltd. 82
Rooster Publicity Ltd.
Halliburton Oil Well Cementing Co. 30
Hill & Christopher, Inc.
John Blackwood Hodge & Co. Ltd. 90
Stephens Advertising Service Ltd.
Houdry Process Corporation 56
John Falkner Arndt & Co.
Hughes Tool Company Cover III
Foote, Cone & Belding
Hydrocarbon Research, Inc. 23
O. S. Tyson & Co., Inc.
International Harvester Co., Inc. 65
McCann-Erickson Corp.
International Paints Ltd. 80
Mayfair Advertising Ltd.
Wm. Kenyon & Sons Ltd. 14
Rowlinson-Broughton
Richard Klinger Ltd. 73
S. H. Wright & Co. Ltd.
Lake & Elliot Ltd. 81
Ripley Preston & Co. Ltd.
Lane-Wells Company Cover II
Darwin H. Clark Company
Lionweld Ltd. 82
Kidds Advertising Ltd.
The Lummus Company 28
Harris D. McKinney, Inc.
McCullough Tool Company 2
Richard P. Casterline Advertising
Mather & Platt Ltd. 12
Sydney R. Wicks Ltd.
Metropolitan-Vickers Electrical Co. Ltd. 16
Technical & General Adv. Agency Ltd.
A. P. Newall & Co. Ltd. 1
Osborne-Peacock Co. Ltd.
Nordstrom Valve Div. (Rockwell Mfg. Co.) 13
Marsteller, Gebhardt & Reed, Inc.
Samuel Osborn & Co. Ltd. 89
D. & C. & Wm. Press Ltd. 88
Taylor Advertising Ltd.
The Pyrene Co. Ltd. 8
Nelson Advertising Service Ltd.
Rice Hotel 76
Ritchie Advertising Agency
Schlumberger Well Surveying Corp. 55
Rives, Dyke & Company
Socony-Vacuum Oil Company 27
Compton Advertising, Inc.
Standard Oil Company (N. J.) 69
McCann-Erickson Corporation
Standard-Vacuum Oil Company 17
Sam J. Gallay Advertising
Sun Shipbuilding & Dry Dock Co. 71
Doremus-Eshleman Co.
John I. Thornycroft & Co. Ltd. 87
Motor & Technical Publicity Ltd.
Tide Water Associated Oil Co. 15
Lennen & Mitchell, Inc.
Toronto Iron Works Ltd. 67
The James Fisher Co. Ltd.
Universal Oil Products Co. 84-85
Simmonds & Simmonds, Inc.
Vokes Ltd. 83
Crane Publicity Ltd.
Westinghouse Electric International Co. 75
National Export Advertising Service, Inc.
Wyatt Metal & Boiler Works Cover IV
Wallace Davis & Company
Whessoe Ltd. 25
Roles & Parker Ltd.
Youngstown Sheet & Tube Company 3
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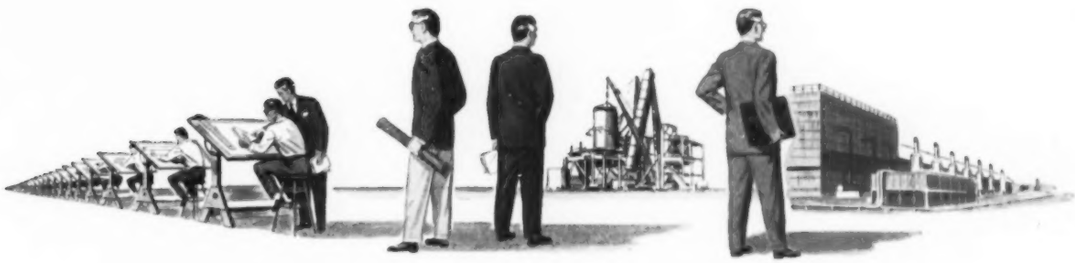

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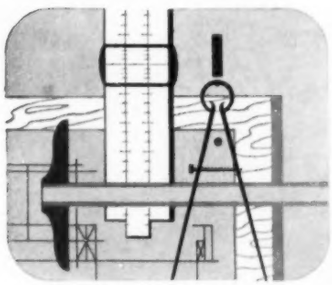
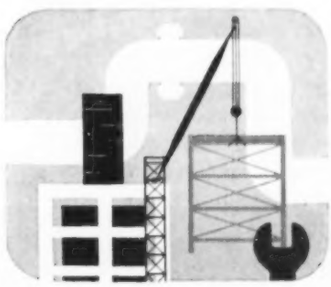
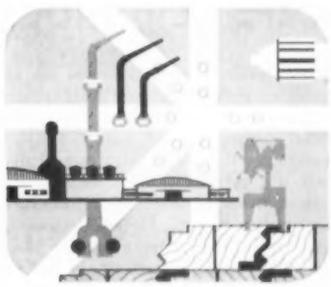
Fluor's Construction Division is permanently staffed with over 250 key men experienced in the erection of plants and facilities both in and out of the United States. This large reservoir of craftsmen assures the availability of competent men for every worldwide project, who work in close cooperation with Fluor's engineering groups and the client's personnel.

A Manufacturer?

Fluor's Manufactured Products Division is a large, completely integrated organization devoted exclusively to the design, development and manufacture of natural draft and mechanical draft cooling towers, air-cooled heat exchangers, pulsation dampeners, mufflers, gas cleaners and special products for industry. Fluor products are in demand the world over.







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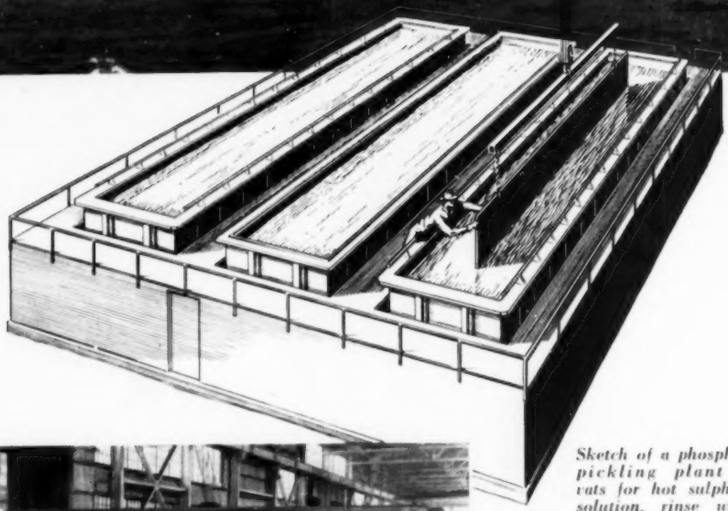
Greater Corrosion Resistance for Welded Steel Tanks

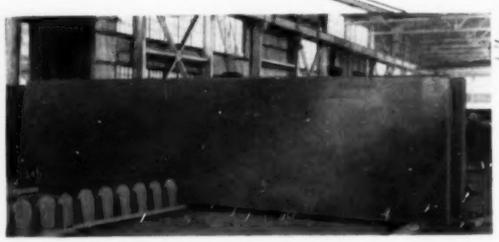
Pickling and Painting by the HORTON PHOSPHORIC ACID PROCESS

The Horton phosphoric acid process is an efficient, economical means of removing the mill scale from fabricated steel plates and improves the bond between the metal and the prime coat of paint. Mill scale is removed by immersing the fabricated steel in a hot sulphuric acid solution. After the mill scale is removed, the steel is rinsed in a water bath and then immersed in a phosphoric acid solution. Here, a thin film of iron phosphate is deposited on the surface of the metal. While the steel is still warm, a coat of special priming paint is applied to those areas which will receive subsequent coats of field paint.

The Horton phosphoric acid process provides a clean, dry surface for the prime coat and valuable corrosion-resistance on unprotected surfaces during shipping and erection. Write our nearest office for further information, estimates or quotations on this time and money saving service. There is no obligation on your part.



Sketch of a phosphoric acid pickling plant showing vats for hot sulphuric acid solution, rinse water and phosphoric acid solution.



Pickled plates drying in rack after special priming coat has been applied.

The steel used in building the two 20,000-bbl. Hortonspheroids pictured above was pickled and painted by the Horton phosphoric acid process to provide greater corrosion resistance.

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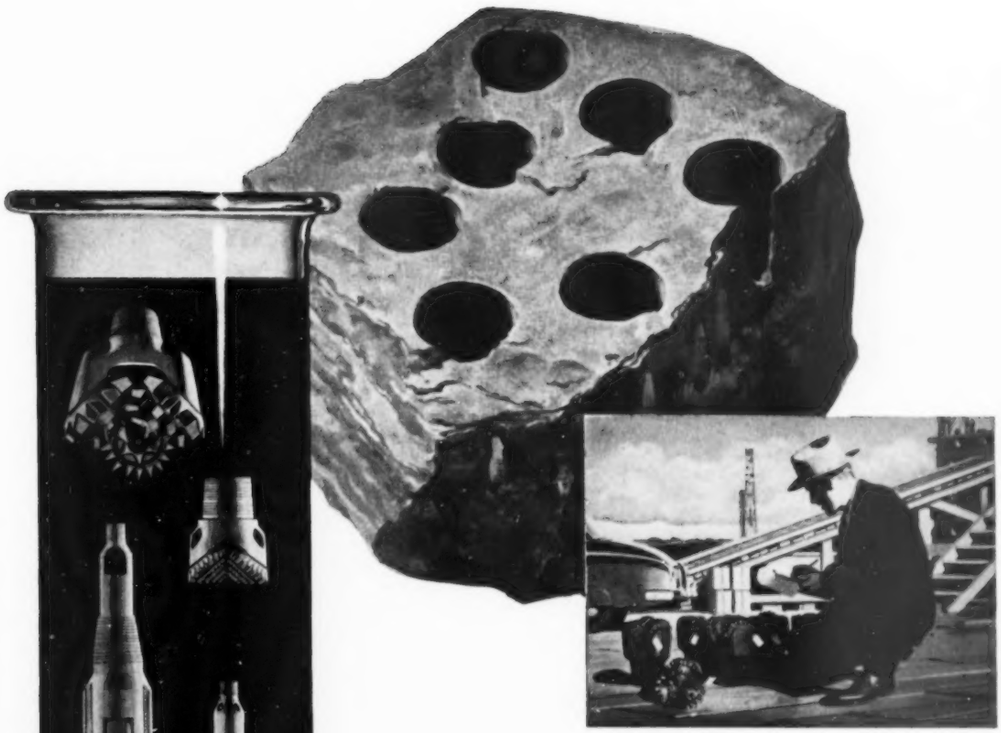

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We've never made a rock bit that completely satisfied us . . . and we never will, although we have made millions of bits. One improvement has invariably led to others, opening new frontiers for research and progress. As a result, record breaking bits of not too many years ago have become today's museum pieces.

Through the years Hughes Tool Company's expenditures in research and engineering to improve the performance of its bits and advance rotary drilling have run into millions of dollars. Currently, these expenditures are at a rate of more than $1,500,000 per year.

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